- learning mathematics enjoyably and usefully since it has real applications in your practical life.
- We have introduced you the subject in a simple way to help building mathematical knowledge and the patterns of sagacious thinking as well.
- We have shown the important role of mathematics related to the other scientific knowledge.

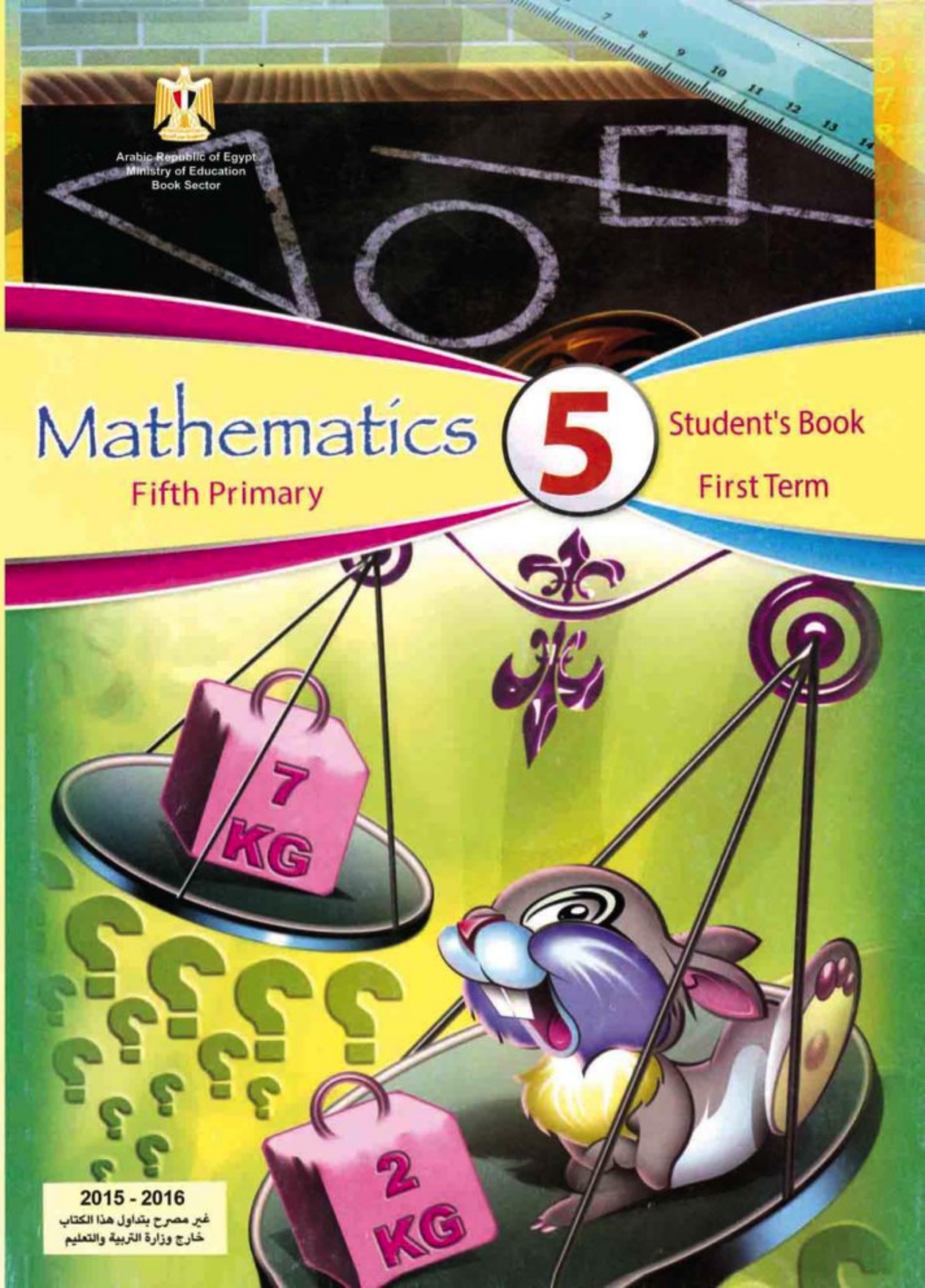
# Mathematics 5

Fifth Primary

Student's Book

First Term

الأشراف برنتنج هاوس



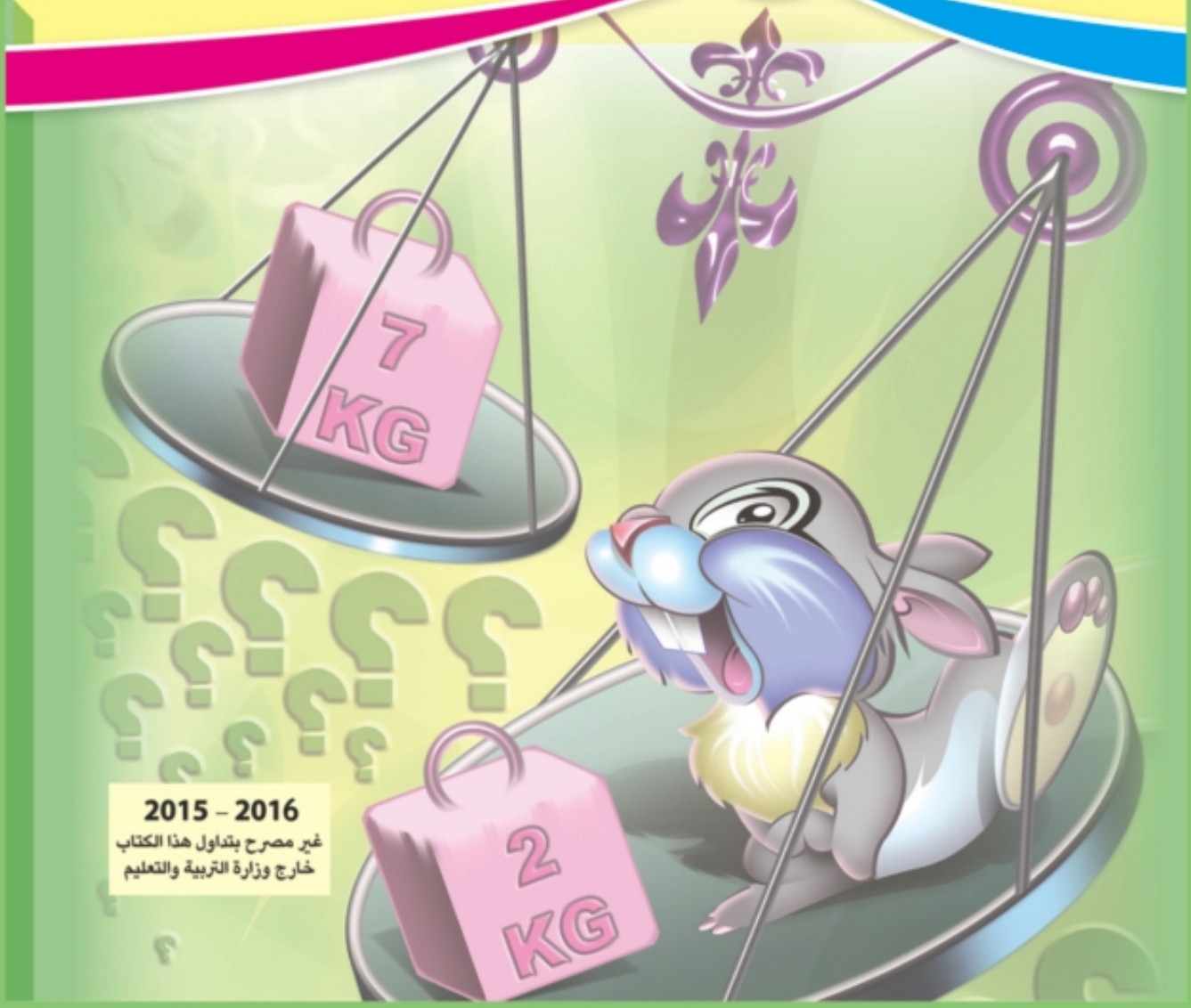
Arabic Republic of Egypt
Ministry of Education
Book Sector

# Mathematics

## Fifth Primary

# 5

## Student's Book
## First Term




2015 – 2016

غير مصرح بتداول هذا الكتاب
خارج وزارة التربية والتعليم

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بسم الله الرحمن الرحيم

**Dear students:**

It is extremely great pleasure to introduce the mathematics book for fifth primary. We have been specially cautious to make learning mathematics enjoyable and useful since it has many practical applications in real life as well as in the other subjects. This gives you a chance to be aware of the importance of learning mathematics, to determine its value and to appreciate the mathematicians roles.

This book sheds new lights on the activities as a basic objective. Additionally, we have tried to introduce the subject simply and excitingly to help attaining mathematical knowledge as well as gaining the patterns of positive thinking skills which pave your way to creativity.

This book is divided into units, each unit contains lessons. Colors and pictures are effectively used to illustrate some mathematical concepts and the properties of figures. Lingual level of previous study has also been taken into consideration.

Our great interest here is to help you get the information by yourself in order to develop your self-learning skills.

Calculators and computer sets are used when there's a need for. Exercises, practices, general exams, Activities, unit test, general tests, and final term tests attached with model answers have been included to help you review the curriculum completely.

Eventually, we hope getting on the right track for the benefits of our students as well as for our dearest Egypt hoping bright future to our dearest students.

**Authors**

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# List of Symbols

| | | | |
|---|---|---|---|
| C | Set of counting numbers | $\leqslant$ | Less than or equal to |
| E | Set of even numbers | = | Equal to |
| O | Set of odd numbers | $\neq$ | Not equal to |
| P | Set of prime numbers | | Open curve |
| $\varnothing$ or { } | Null set or empty set | | Closed curve |
| $\in$ | Belonging | | Circle |
| $\notin$ | Not belonging | r | radius |
| $\subset$ | Inclusion | $\pi$ | Approximate ratio |
| $\not\subset$ | Not inclusion | $\overline{AB}$ | Line segment $\overline{AB}$ |
| $\cup$ | Union | $\overrightarrow{AB}$ | Ray $\overrightarrow{AB}$ |
| $\cap$ | Intersection | $\overleftrightarrow{AB}$ | Straight line $\overleftrightarrow{AB}$ |
| U | Universal set | $\angle$ | Angle |
| $X^c$ | Complement set | m ($\angle$ B) | Measure angle (B), m ($\angle$B) |
| X-Y | X difference Y | P (E) | Probability of event P P (E) |
| N | Set of natural numbers | $\equiv$ | Congruent |
| > | More than | $\triangle$ | Triangle |
| $\geqslant$ | More than or equal to | (X, Y) | Ordered pair X, Y (X, Y) |
| < | Less than | | |

# Unit One

# Fractions

1

# Revision

**1** **Convert the following fractions to fractions with denominator 10, then convert to the decimal form:**

**Example :** $\frac{14}{5} = \frac{28}{10} = 2.8$

(A) $\frac{5}{2} = \frac{\quad}{10} = ___$

(B) $\frac{36}{30} = ___ = ___$

(C) $\frac{55}{50} = ___ = ___$

(D) $\frac{14}{20} = ___ = ___$

(E) $\frac{45}{50} = ___ = ___$

(F) $\frac{95}{25} = ___ = ___$

**2** **Write down the following numbers in the form of decimal numbers (as shown):**

**Example :** $12\frac{23}{50} = 12\frac{46}{100} = 12.46$

(A) $8\frac{3}{25} = ___$

(B) $37\frac{1}{4} = ___$

(C) $\frac{129}{50} = ___$

(D) $\frac{115}{500} = ___$

**3** **Write down the following numbers in the form of an integer number and a fraction (as shown):**

**Example :** $3.28 = 3\frac{28}{100} = 3\frac{7}{25}$

(A) 7.35 = .....

(B) 6.07 = .....

(C) 12.56 = .....

(D) 9.003 = .....

**4** **Put the following numbers in their appropriate places inside the rectangles below:**

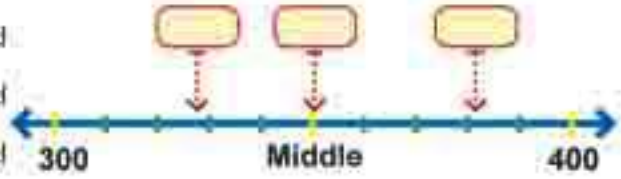
**328 , 382 , 350**

**Then complete:**

328 ≃ ..... to the nearest hundred

382 ≃ ..... to the nearest hundred

350 ≃ ..... to the nearest hundred



**5** **Complete the following table:**

| Number | Number to the nearest 10 | Number to the nearest 100 | Number to the nearest 1000 | Number to the nearest unit |
|---|---|---|---|---|
| 4723.6 | ..... | ..... | ..... | ..... |
| 7259.2 | ..... | ..... | ..... | ..... |
| 64345.97 | ..... | ..... | ..... | ..... |

**6** **Match each number with its approximated value to the nearest unit:**

| | | |
|---|---|---|
| 75.57 | 76 | 47.39 |
| $47\frac{2}{3}$ | 47 | $75\frac{3}{7}$ |
| $75\frac{4}{9}$ | 48 | 47.71 |
| | 75 | |

**7** **Approximate the following numbers to the nearest tenth:**

(A) 63.23 (B) 432.76 (C) 7023.54

(D) $367\frac{3}{4}$ (E) $24\frac{3}{20}$ (F) $\frac{7}{50}$

**8** **Find the sum of the follwoing operations, then approximate the sum according to the approximation required:**

(A) 32.27 + 13,5 = ..... ≃ ..... to the nearest tenth.

(B) 18.07 + 421.45 = ..... ≃ ..... to the nearest unit

(C) 854.49 - 32.71 = ..... ≃ ..... to the nearest ten

(D) 743.65 - 512.28 = ..... ≃ ..... to the nearest tenth

# 1-1

# Approximating to the nearest hundredth and thousandth

## You will learn

- To approximate to the nearest hundredth.
- To approximate to the nearest thousandth.

## Key Terms

- Approximating
- Hundredth
- Thousandth

## First: Approximating to the nearest hundredth

### Think and discuss

**The teacher asked Fared and Huda to approximate 172.476 to the nearest hundredth.**

**Fared answered:**

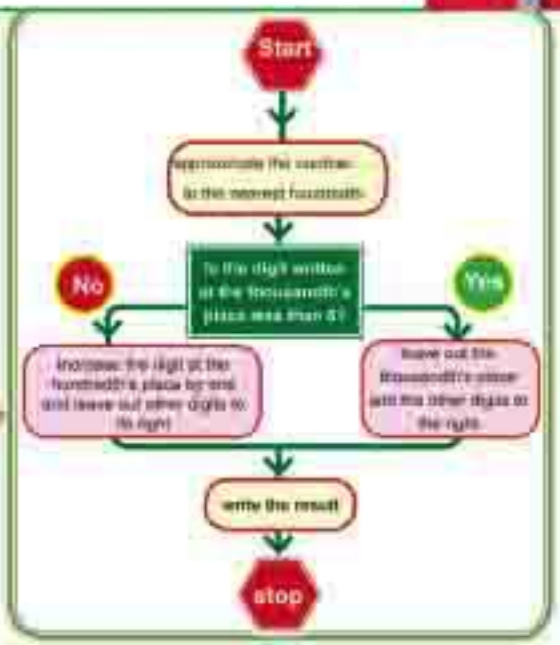
The number **172.476** is between **172.47 and 172.48**

However, it is closer to **172.48** than **172.47**

**Therefore, 172.476 ≃ 172.48** approximated to the nearest hundredth.

**Hoda suggested:**

Using the opposite flow chart to approximate the number to the nearest hundredth.



## Practice

**1** **Approximate the following numbers to the nearest hundredth:**

- (A) 76.514 ≃ .....
- (B) 52.608 ≃ .....
- (C) 175.325 ≃ .....
- (D) 69.743 ≃ .....
- (E) 0.737 ≃ .....
- (F) $3\frac{17}{500}$ ≃ .....

**2**

The capacity of a cola bottle = 0.192 liters

≃ ..... liters

**(to the nearest hundredth)**

**A micrometer is a device used for precise measuring. It is used to measure the thickness of a paper and it was** 0.136 mm

Complete: the thickness of the paper

≃ ..... mm

**(to the nearest hundredth)**

The reading of the opposite gas meter

≃ ..... cubic meter

**(approximate to the nearest hundredth.)**

## Second: Approximating to the nearest thousandth

### Think and discuss

**The teacher asked Hend to approximate the number 31.6452 to the nearest thousandth.**

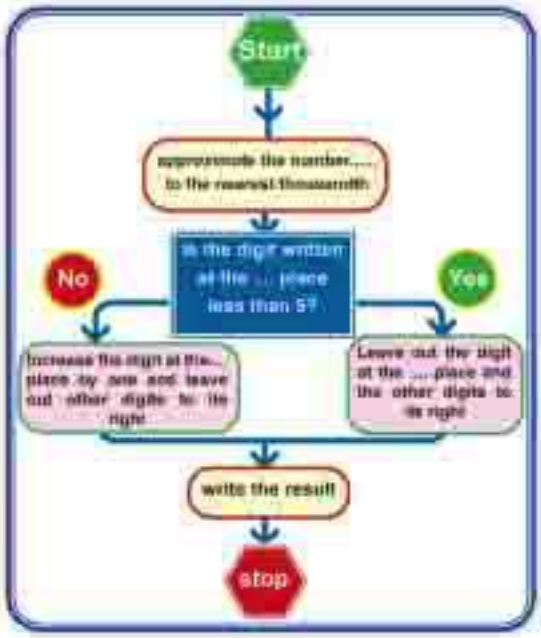
**Hend answered:**

The number **31.6452** is between **31,645, and 31,646** However, it is closer to **31,645** than **31,646**

**Therefore, 31.6452 ≃ 31.645**

### Practice

In the opposite figure: Complete the flow chart to represent the steps followed to approximate to the nearest thousandth.




### Example

**Approximate 4.6798 to the nearest thousandth.**

**Result:**

The digit at the thousandth place is 9, the digit at the ten thousandth's place is 8 which is greater than 5.

Therefore, we increase the digit at the thousandth's place by one. Then, it will be≃4.6798 = 4.680

### Note that

When approximating to the nearest thousandth, the result of approximating must include 3 decimal digits even if the digit of the thousandth's place is equal to zero.

## Practice

**1** **Complete the following table:**

| Number | approximate to the nearest hundredth | approximate to the nearest thousandth |
|---|---|---|
| 43.5426 | | |
| 537.2983 | | |
| 21.84792 | | |
| 0.38327 | | |
| 6.5297 | | |

**2** **Complete:**

The length of a cell measured by a microscope = 0.3527 mm

≃ .....mm

**to the nearest thousandth**

**Each tablet contains some ingredients as shown in the following table:**

| compound | weight in (gm) | weight approximated to the nearest thousandth |
|---|---|---|
| A | 0.0032 | |
| B | 0.0546 | |
| C | 0.1379 | |

**Example**

**Given that L = 52.3723, M = 21.7494. Estimate the sum of L+M then compare your estimation with the sum to the nearest hundredth.**

**Result:**

L = 52.3723
M = 21.7494
L + M = 52.3723 + 21.7494
= 74.1217

≃ 74.12 Since the value is closer to the estimate, the value is acceptable.

**Estimate the result**

Estimate of L = 52
Estimate of M=22
Estimate of (L + M) = 74

## Think

Ahmed bought some stuff from a shopping center. Can you estimate the total of what he paid in LE approximating it to the nearest ten pounds?
Make sure that your estimation is acceptable for the actual sum.

**Reciept**

| price (LE) | item |
|---|---|
| 15.25 | soap |
| 68.75 | washing powder |
| 64.75 | perfumes |
| 98.25 | meat |
| 170.5 | clothes |
| 28.25 | vegetables |

## Exercises

**1** **Approximate 4.7398 to the nearest**

(A) hundredth (B) thousandth

**2** **Choose the correct answer from parantheses:**

(A) 736.592 ≃ 736.59 to the nearest .....

(tenth - hundredth - thousandth).

(B) 82.497 ≃ 82.50 to the nearest .....

(tenth - hundredth - thousandth).

(C) $3\frac{1}{8}$ = ..... to the nearest hundredth.

(3.10 - 3.12 - 3.13)

(D) 13.376 + 15.75 = ..... to the nearest hundredth.

(29.13 - 29.12 - 29.10)

E) 37.4289 - 14.081 ≃ ..... to the nearest hundredth.

(23.350 - 23.348 - 23.248 )

F) 8.657 meters ≃ ..... to the nearest centimeter.

(866 - 8.66 - 8.6)

3) Write down the smallest decimal fraction that includes the digits (2, 5, 7, 8), then approximate that number to the nearest hundredth and nearest thousandth.

4) **Complete:**

A) The number 4.559 ≃ 4.6 to the nearest .....

B) The difference between $\frac{41}{500}$, 0.473 = ..... ≃ ..... to the nearest tenth.

C) $3\frac{3}{4} - 1\frac{3}{200}$ = ..... ≃ ..... to the nearest hundredth.

D) 4357 ÷ 1000 = ..... ≃ ..... to the nearest hundredth.

5) A road extends for 74389 meters. Find its length in kilometers approximating the result to the nearest hundredth.

6) **Complete:**

A) 39 days ≃ ..... weeks.

B) 255 hours ≃ ..... days.

C) 12.4658 kilometers ≃ ..... kilometers.

D) 67 months ≃ ..... years.

7) **Given that:** **X = 13.452 ,** **Y = 7.273**

Find X + Y approximating the sum to the nearest hundredth.

Estimate the sum of X+ Y . Is your estimation acceptable? Explain.

# 1-2

## Comparing fractions

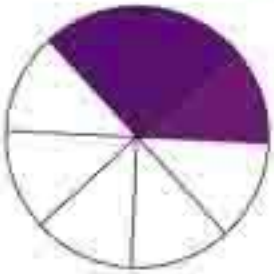
**You will learn**

- To compare fractions.

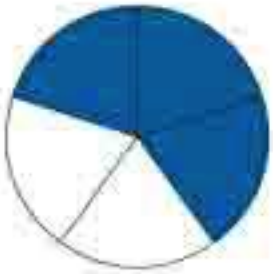
**Key Terms**

- greater than >
- less than <
- Equal to =

**Think and discuss**



The fraction graphed by the colored section = $\frac{3}{8}$



The fraction graphed by the colored section= $\frac{3}{\ }$

**put (> , < or =)**

$\frac{3}{8}$ ..... 1

$\frac{3}{8}$ ..... 0.5

$\frac{5}{8}$ ..... $\frac{3}{8}$

**put (> , < or =)**

$\frac{3}{5}$ ..... $\frac{3}{8}$

$\frac{3}{5}$ ..... $\frac{1}{2}$

$\frac{3}{5}$ ..... $\frac{6}{10}$

**When the numerator is the same in the two fractions**

$\frac{8}{17} < \frac{8}{11}$

because 17 > 11

**When the denominator is the same in the two fractions**

$\frac{8}{11} > \frac{5}{11}$

because 8 > 5

**Practice**

**1** put (> , < or =) to have a true sentence:

$\frac{7}{13}$ $\frac{5}{13}$ | $\frac{8}{25}$ $\frac{8}{13}$ | $\frac{7}{9}$ $2\frac{1}{9}$

## Mental Math

1. Rearrange the following fractions ascendingly (from the smallest to the greatest):

$\frac{7}{18}$, $\frac{5}{18}$, $\frac{1}{18}$, $\frac{25}{18}$, $\frac{13}{18}$

2. Rearrange the following fractions descendingly (from the greatest to the smallest)

$\frac{13}{7}$, $\frac{5}{7}$, $\frac{9}{7}$, $\frac{4}{7}$, $\frac{11}{7}$

3. Find the possible values of X which satisfy the following relations, where X is an integer.

(A) $\frac{4}{7} < \frac{x}{7} < \frac{8}{7}$ (B) $\frac{5}{8} < \frac{5}{x} < 1$

4. Rearrange the following fractions once ascendingly and the other descendingly. You can use the number line:

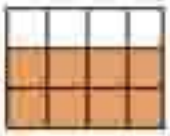
$\frac{11}{12}$, $\frac{5}{12}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$

## Comparing two fractions with different denominators

**Which is greater $\frac{3}{4}$ or $\frac{2}{3}$?**

the fraction $\frac{3}{4}$ graphed by the colored section:

the fraction $\frac{2}{3}$ graphed by the colored section:



$\frac{3}{4} = \frac{9}{12}$ $\frac{2}{3} = \frac{8}{12}$

$\frac{9}{12} > \frac{8}{12}$ because $9 > 8$

i.e. $\frac{3}{4} > \frac{2}{3}$

**Note that:**

$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ , $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

**i.e. To compare two fractions with different denominators, we find their common denominator. In other words, we find the least common denominator (LCD).**

**Which is greater $\frac{3}{5}$ or $\frac{4}{7}$?**

(LCD) of the two denominators 5 and 7 = 5 × 7 = 35

$\frac{3}{5} = \frac{3 \times 7}{5 \times 7} = \frac{21}{35}$ , $\frac{4}{7} = \frac{4 \times 5}{7 \times 5} = \frac{20}{35}$

**Then :** $\frac{21}{35} > \frac{20}{35}$ **i.e.** $\frac{3}{5} > \frac{4}{7}$

## Practice

Compare the following fractions:

(A) $\frac{3}{4}$ , $\frac{2}{5}$ (B) $\frac{7}{9}$ , $\frac{3}{4}$ (C) $\frac{3}{5}$ , $\frac{5}{8}$

(D) $\frac{7}{12}$ , $\frac{4}{5}$ (E) $\frac{4}{5}$ , $\frac{3}{7}$ (F) $\frac{7}{8}$ , $\frac{6}{7}$

## Comparing fractions and decimals

You can convert common fractions into decimals and you can compare them as you have learned in the approximating lesson (using you calculator)

**Example**

**Rearrange the following numbers ascendingly:** $3\frac{1}{2}$ , 5 , 3.2 , $4\frac{1}{3}$ , $4\frac{2}{7}$

**Note that:** The smallest number is 3.2, while the greatest number is 5.

To compare $3\frac{1}{2}$ , 3.2

We compare $\frac{1}{2}$ , 0.2 i.e., we compare 0.5, 0.2

0.5 > 0.2 → $3\frac{1}{2} > 3.2$

To compare $4\frac{1}{3}$ , $4\frac{2}{7}$ proceed as follows:

$$\frac{1}{3} = \frac{7}{21} \text{ , } \frac{2}{7} = \frac{6}{21} \text{ then } 4\frac{1}{3} > 4\frac{2}{7}$$

**Therefore, the ascending Rearrange is:** **3.2 , $3\frac{1}{2}$ , $4\frac{2}{7}$ , $4\frac{1}{3}$ , 5**

That Rearrange can be shown on the number line:

**Rearrange the following fractions:**

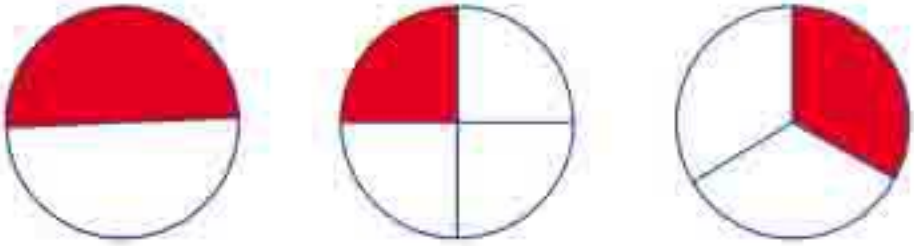
**first:** rearrange $7\frac{1}{6}$ , 5.3 , $7\frac{2}{11}$ , $5\frac{4}{7}$ , 6 **descendingly.**

**second :** rearrange 8,11 $\frac{4}{5}$ , $12\frac{3}{7}$ , $\frac{61}{7}$ , 12.4 **ascendingly.**

## Exercises

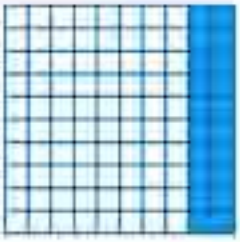
**1** **State what the colored section represents in each figure, then rearrange the fractions ascendingly**

**A**



**Ascending Rearrange** .....

B



Ascending Rearrange: _____

**2 put (✓) or (✗):**

A $4376 < 0.407$ ( )

B $50.61 > 0.501$ ( )

C $\frac{7}{8} > 0.775$ ( )

D $3.5 > 3\frac{4}{9}$ ( )

E $2\frac{7}{9} < 2.7$ ( )

F $\frac{1}{4} = 0.25$ ( )

**3 Find the values of a, b, and c if:**

A $\frac{2}{5} = \frac{a}{15}$

B $\frac{b}{8} = \frac{15}{24}$

C $\frac{2}{3} = \frac{16}{c}$

**4 Rearrange the following numbers ascendingly:**

A $\frac{12}{15}$ , $\frac{12}{7}$ , $\frac{12}{7}$ , $\frac{12}{13}$ , $\frac{12}{15}$

B $\frac{3}{2}$ , $\frac{3}{5}$ , $\frac{3}{8}$ , $\frac{6}{8}$ , $\frac{18}{21}$

# 1-3

## Multiplying fractions and decimal numbers by 10, 100, 1000

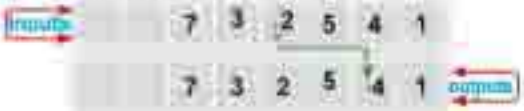
Let's work together

**Work with your classmate using the calculator:**

1. Enter **32.657** on your calculator as illustrated on the opposite figure, then multiply that number by 10. Notice the change of the position of the decimal point within the result.

**How many places has the decimal point moved to the right direction?**

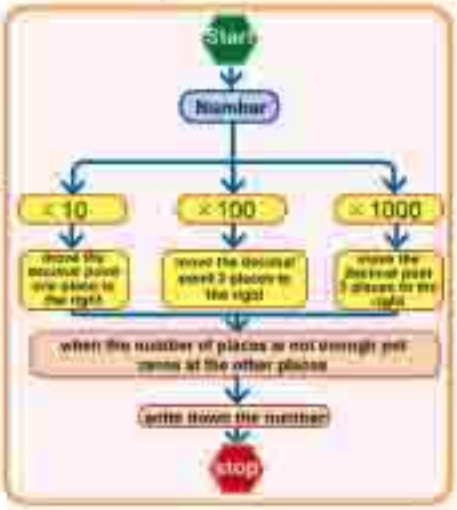
2. Enter **73.2541** on your claculator, then multiply that number by 100. Notice the the change of position of the decimal point within the result.




**How many places has the decimal point moved to the right direction?**

If we multiply that number by 1000. How many places will the decimal point move to the right direction?

**Notice the flow chart illustrating the operations within that lesson:**




**You will learn**

- To multiply fractions and decimal numbers by 10, 100, 1000

**Key Terms**

- Decimal fraction
- Decimal number

## Practice

**Complete:**

35.321 × 10 = ..... , 27.134 × 100 = .....

12.3 × 1000 = ..... , 7.5621 × 10000 = .....

## Exercises

**1 Complete:**

A 3.18 × 10 = ..... B 3.2 × 10 = ..... C 5.748 × 100 = .....

D 72.14 × 100 = ..... E 9.7 × 100 = ..... F 3.2172 × 1000 = .....

G 62.819 × 1000 = ..... H 0.341 × 1000 = ..... I 7.32 × 1000 = .....

J ( 72.12 + 2.7 ) × 10 = ..... K (8.35 - 2.14) × 100 L (2.35 × 10)-11.1 = .....

**2 Choose the correct answer from the parentheses:**

A 98.7 × 100 = ..... (987 - 9870 - 0.987 - 0.0987)

B 0.067 × 1000 = ..... (6.7 - 67 - 0.067 - 670)

C 21.3 × 10 = ..... (2130 - 2.13 - 213 - 0.0213)

**3 Put (< , > or =) in the empty spaces:**

A 4.72 × 10 ☐ 0.472 × 100

B 3.251 × 100 ☐ 325.1 × 100

C 72.15 × 10 ☐ 0.07215 × 1000

**4 Complete:**

A 3.002 Kilograms = ..... grams. B LE 728.9 = ..... piasters

C 37.3 decimeters = ..... centimeters. D 3.6 Kilometers = ..... meters

# 1-4

# Multiplying a fraction or a decimal number by an integer

## Let's work together

The math teacher asked the groups in the class to find the area of a rectangle in which the lengths of its sides are 23.25cm and 15cm. Each group drew the rectangle and calculated its area in a different method. Fill in the blanks to find the area.

**The first group**

Area = 23.25 × 15

$= \frac{2325}{100} \times 15$

= ☐☐☐.☐☐ $cm^2$

**The second group**

Area = 15 × 23.25

$= 15 \times \frac{2325}{100}$

= ☐☐☐.☐☐ $cm^2$

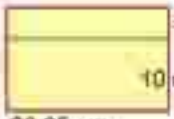
**The third group:**

Area = 23.25 × (10 + 5)

= 23.25 × 10 + 23.25 × ...

= ... + $\frac{2325}{100}$ × ...

= ☐☐☐.☐☐ $cm^2$



The teacher said: Despite the difference of the solutions, all the answers are correct.

**Explain that by completing the following sentences:**

1. 23.25 × 15 = 15 × ... what do you observe?
2. 23.25 × (10 + ...) = 23.25 × ... + 23.25 × 5, what do you observe?

**You will learn**

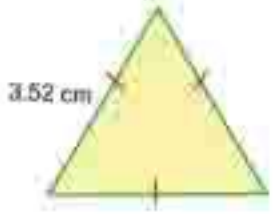
- To multiply a fraction or a decimal number by an integer

**Key Terms**

- Decimal fraction
- Decimal number

## Practice

**Find the perimeter of each of the following shapes:**



## Exercises

**1** If: **326 × 7 = 2282** , **37 × 52 = 1924, then complete the following without multiplying:**

(A) 3.26 × 7 = ....  (B) 0.0326 × 7 = ....  (C) 32.6 × 7 = ....

(D) 3.7 × 52 = ....  (E) 0.37 × 52 = ....  (F) 0.326 × 7 = ....

(G) 0.0037 × 52 = ....  (H) 37 × 5.2 = ....  (I) 0.00326 × 7 = ....

(J) 3.26 × 17 = 3.26 × ( 7 + .... ) = 3.26 × 7 + .... × .... = ....

**2** **Find the result of each of the following:**

(A) 2.37 × 5 = ....  (B) 0.251 × 9  (C) 0.819 × 8 = ....

(D) 34.2 × 7 = ....  (E) 1.352 × 11  (F) 2.15 × 7 + 2.15 × 3

**3** The price of a bar of chocolate is LE 2.75, what is the cost of 15 bars of the same kind?

**4** Ahmed bought 12 cans of juice. The price of each can was LE 1.75. What is the total cost of the juice? How much would the seller pay back to Ahmed if he paid him LE 30?

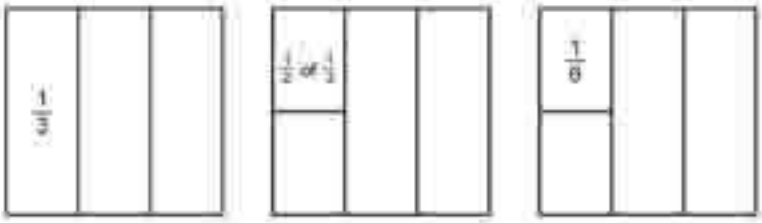
# 1-5

## Multiplying common fractions

**You will learn**

- Multiplication of common fractions

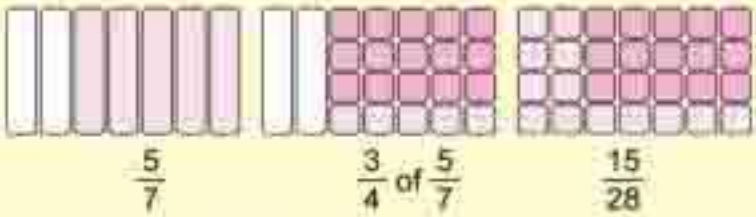
Soad wanted to deduce the product of $\frac{1}{2} \times \frac{1}{3}$. She used a piece of paper and divided it according to the following steps:




i.e.: $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

**Example**

**Find the product of** $\frac{3}{4} \times \frac{5}{7}$:




i.e.: $\frac{3}{4} \times \frac{5}{7} = \frac{3 \times 5}{4 \times 7} = \frac{15}{28}$

**In general:**

$\frac{3}{5} \times \frac{3}{8} = \frac{3 \times 3}{5 \times 8} = \frac{9}{40}$ ,

$\frac{2}{9} \times \frac{5}{7} = \frac{10}{63}$ and so on....

# 1-6

# Multiplying decimal fractions

**You will learn**

- To multiply a decimal fraction by a decimal number.

**Note that**

(1)

0.6 = 6 tenths

$0.6 = \frac{1}{10} \times 6$

$0.4 = \frac{1}{10} \times 4$

$0.6 \times 0.4 = \frac{1}{10} \times 6 \times \frac{1}{10} \times 4$

$= \frac{1}{100} \times 24$

$0.6 \times 0.4 = 0.24$

(2)

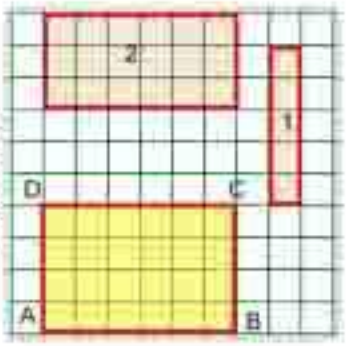
$0.6 = \frac{6}{10}$ , $0.4 = \frac{4}{10}$

$0.6 \times 0.4 = \frac{6}{10} \times \frac{4}{10}$

$= \frac{24}{100}$

## First: Multiplying a decimal fraction by a decimal number

**Think and discuss**




**In the opposite figure:**
The length of the rectangle ABCD is 6 tenths and its width is 4 tenths. The area of the rectangle at the figure = The number of square units inside the shape = 24 hundredths

**Complete using the shape:**

| The rectangle | length | width | area | |
|---|---|---|---|---|
| ABCD | 0.6 | 0.4 | 0.24 | 0.6 × 0.4 = 0.24 |
| Shape (1) | ..... | 0.1 | ..... | ..... × ..... = 0.05 |
| Shape (2) | ..... | 0.3 | ..... | ..... × 0.3 = ..... |

**Practice**

**Find the result of:**

| | | | |
|---|---|---|---|
| 3.7 | → one decimal number | 0.53 | 1.29 |
| × 0.6 | → one decimal number | 0.32 | 0.34 |
| □□□ | → Two decimal numbers | □□□ | ..... |
| | | □□□ | ..... |
| | | □□□□ | ..... |

**2 Observe and Complete:**

$\frac{3}{5} \times \frac{1}{2} = 0.6 \times 0.5 = ....$ or $\frac{3}{5} \times \frac{1}{2} = \frac{3 \times 1}{5 \times 2} = \frac{...}{...} = ....$

**Second: Estimating the products of multiplying a fraction, or a decimal number by a fraction or a decimal number.**

**Example**

**Find the result: 7.6 × 2.2**

(A) $7.6 \times 2.2 = \frac{67}{10} \times \frac{22}{10}$

$= \frac{1672}{100}$

$= \boxed{1}\boxed{6}, \boxed{7}\boxed{2}$

**Estimating**

(B) 7.6 is estimated to 8

2.2 is estimated to 2

The estimation of the result of 8 × 2 = 16

(C)

```
   76
 × 22
 ----
  152
 152
 ----
16.72
```

the result

- Numbers can be multiplied as integers, and we find the position of the decimal point in the result.

## Practice

**(1) First: estimate the following products, then compare your estimation to the actual result:**

(A) 5.89 × 6.1 Estimated result ..... actual result .....

(B) 28.7 × 3.1 Estimated result ..... actual result .....

(C) 3.9 × 0.704 Estimated result ..... actual result .....

## Exercises

**(1) Find the result:**

(A) 0.12 × 0.3 = ..... (B) 0.625 × 0.7 = ..... (C) 7.2 × 0.9 = .....

(D) 1.2 × 0.37 = ..... (E) 1.25 × 0.24 = ..... (F) 0.36 × 0.75 = .....

**(2) Compare the products of the following by putting < or > or =:**

(A) 7.3 × 0.28 ☐ 0.73 × 2.8

(B) 0.342 × 1.2 ☐ 3.42 × 0.12

(C) 172 × 0.003 ☐ 0.172 × 0.3

**3** **Find the result:**

| | | |
|---|---|---|
| 0.67 | 2.03 | 9.72 |
| × 2.8 | × 0.07 | × 0.46 |

**4** **Put ( > or < or = ) to make the following sentences true:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A | 12.35 | × | 2.5 | ☐ | 12.35 | × | 0.25 | |
| B | 48.2 | × | 3.7 | ☐ | 4.82 | × | 37 | |
| C | 4.2 | × | 1.53 | ☐ | 4.2 | × | 15.3 | |
| D | 0.206 | × | 1.5 | ☐ | 2.06 | × | 0.3 | × 0.5 |

**5** **Find the result:**

A 2.3 × 7.4 B 7.4 × 0.59

**Use the resulted products to find the value of:**

**First:** (2.3 × 7.4) × 0.59. **Second:** 2.3 × ( 7.4 × 5.9 ), **what do you observe?**

**6** **Find the results of:**

A 23.17 × 0.75 = ... B 1.34 × 3.2

C (26.2 × 4.7) - 3.14 D (5.32 × 0.15) + 0.146

**7** If the price of one meter of cloth is L.E 6.45, what is the cost of 2.4 meters of cloth?

**8** A car covers equal distances in equal times. How many kilometers does it cover in 2 hours and 15 minutes if its speed is 73.25 Kilometers per hour?

**9** **Estimate the products of the following operations, then compare your estimation to the actual result:**

A 5.3 × 2.7 B 18.8 × 7.1 C 7.82 × 4.3

**10** Salwa bought a piece of cloth with 3.75 meters in length. If the price of one meter of cloth was L.E 33.75, find the cost of cloth approximating it to the nearest pound.

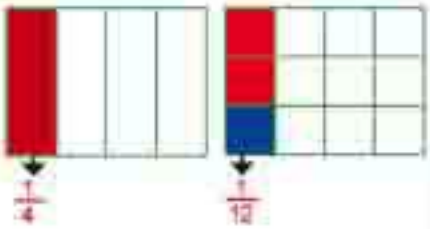
# Division

# 1-7

## (1) Dividing Fractions

**Think and discuss**

Samy wanted to find the quotient of dividing $\frac{1}{4}$ by 3. He used a rectangular piece of paper and divided it into 4 equal parts, then divided the piece of paper into 12 equal parts.




**After drawing, samy noticed that:**

$\frac{1}{4} \div 3 = \frac{1}{12}$

**Would you agree with Samy? why?**

**Note that**

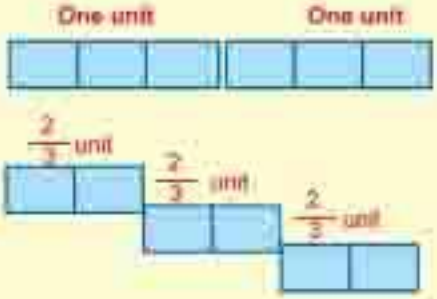
$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$

$\therefore \frac{1}{4} \div 3 = \frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$

**Example**

**Divide $2 \div \frac{2}{3}$**

Divide each unit into 3 equal parts, then construct parts where every part is equal to $\frac{2}{3}$ unit.




$2 \div \frac{2}{3} = 3$

i.e. $2 \div \frac{2}{3} = 2 \times \frac{3}{2} = 3$

**You will learn**

- To divide an integer by a common fraction.
- To divide a common fraction by an integer.
- To divide a common fraction by another common fraction.

**Key Terms**

- Fraction
- Divison

**Example**

Divide: $\frac{3}{4} \div \frac{1}{4}$

**Result:**

$\frac{3}{4} \div \frac{1}{4} = \frac{3}{4} \times \frac{4}{1} = 3$

**What do you oberve?**

**Think** Can you find the quotient of $\frac{2}{5} \div \frac{3}{5}$

## Practice

**1** **Find the quotient of:**

(A) $\frac{4}{5} \div \frac{1}{2} =$ .....  (B) $\frac{3}{8} \div \frac{3}{4} =$ .....

(C) $\frac{1}{2} \div \frac{1}{12} =$ .....  (D) $\frac{2}{7} \div \frac{5}{7} =$ .....

**2** **Complete:**

(A) $1\frac{1}{2} \div 3\frac{3}{4} = \frac{1+2}{2} \div \frac{3+__}{4} = \frac{3}{2} \div \frac{__}{4} = \frac{3}{2} \times \frac{__}{__} = \frac{__}{5}$

(B) $5\frac{1}{2} \div 3\frac{2}{3} = \frac{11}{2} \div \frac{__}{3} = \frac{11}{2} \times \frac{__}{__} = \frac{3}{__}$

**3** **Divide:**

(A) $\frac{3}{4} \div \frac{9}{10}$  (B) $\frac{2}{5} \div \frac{7}{10}$  (C) $\frac{1}{2} \div \frac{3}{10}$

(D) $\frac{9}{10} \div \frac{3}{10}$  (E) $\frac{7}{10} \div \frac{9}{10}$  (F) $\frac{4}{10} \div \frac{6}{10}$

## (2) Dividing fractions and decimal numbers by 10, 100, 1000

**You will learn**

- To divide a decimal fraction or a decimal number by10, 100, 1000

**A charity donor wanted to divide L.E 297.5 by 10 families equally. What is the share of each family?**

The share of each family = $297.5 \div 10 = \frac{2975}{10} \times \frac{1}{10} = \frac{2975}{100}$
= LE 29.75

What do you oberve regarding the number of places moved by the decimal point, and in which direction?

You can also discover the pattern of changing the position of the decimal point to the left while dividing by 10, 100, 1000 using the calculator.

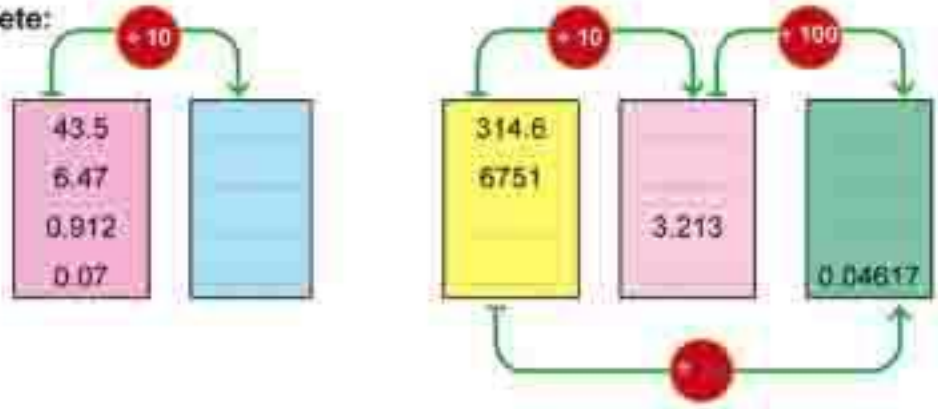
| Using the calculator | Explanation |
|---|---|
| $32.57 \div 10 = 3.257$ | $\frac{3257}{100} \times \frac{1}{10} = \frac{3257}{1000} = 3.257$ |
| $95.74 \div 100 = 0.9574$ | $\frac{9574}{100} \times \frac{1}{100} = \frac{9574}{10000} = 0.9574$ |
| $64.39 \div 1000 = 0.06439$ | $\frac{6439}{100} \times \frac{1}{1000} = \frac{6439}{100000} = 0.06439$ |

**Have you observed a specific pattern? what is that pattern?**

**Saeed said:**
When dividing by 10, the decimal point moves one place to the left.
When dividing by 100 , the decimal point moves two places to the left.
When dividing by 1000 , the decimal point moves three places to the left.

## Practice

**Complete:**




## Exercises

**1 Complete:**

A) 64.43 ÷ 10 =  B) 32.57 ÷ 100 =  C) 49.21 ÷ 1000 =

D) 537.1 ÷ 10 =  E) 6.243 ÷ 100 =  F) 659.1 ÷ 1000 =

**2 Choose the correct answer from the parentheses:**

A) 1.7 ÷ 10 = ..... (17 , 0.17 , 1.7 , 0.017)

B) 75.3 ÷ 100 = ..... (753 , 7.53 , 7530 , 0.753)

C) 8.76 ÷ 1000 = ..... (87.6 , 8.76 , 0.00876 , 8760)

**3 Put the sutiable sign (< or > or =) in each of the following:**

A) 4.532 ÷ 10 ..... 45.32 ÷ 100  B) 3721 ÷ 1000 ..... 0.3721 × 100

**4 Complete:**

A) 3237 grams = ..... kgs.  B) 354 meters = ..... cm.

C) 325 meters = ..... kilometers.  D) 743 mm = ..... cm.

E) 54 kilograms = ..... tons.  F) 734 $cm^3$ = ..... liters

**5** A car consumes one liter of gasoline to travel 10 Kilometers. How many liters of gasoline does it need to travel a distance of 534.8 Kilometers?

# (3) Dividing an integer by a 3-digit number without having a remainder

**Think and discuss**

The librarian at the school asked the students to help him arrange the library. He asked them to put 178 books on 7 shelves equally.

**Ahmed thought:** How many books should we put on every shelf?

**Sameir answered:** We divide 178 by 7, then the quotient is: **25 books and the remainder is 3 books.**

**Ahmed said:** i.e.,

| 178 | = | 7 | × | 25 | + | 3 |
|---|---|---|---|---|---|---|
| ↓ | | ↓ | | ↓ | | ↓ |
| dividened | | divisor | | quotiant | | remainder |

**Note that**

**The dividened = (the divisor × the quotiant)+ the remainder**

**The remainder is always less than the divisor.**

**You will learn**

- to divide an integer by a 3-digit number without having a remainder

**Key Terms**

- Remainder.

## Practice

| number of operation | division | dividened | divisor | quotient | remanider | Relation among the elements of divison |
|---|---|---|---|---|---|---|
| Example | 32 ÷ 5 | 32 | 5 | 6 | 2 | 32 = 5 × 6 +2 |
| 1 | 73 ÷ 8 | ..... | ..... | | ..... | ..... |
| 2 | 42 ÷ 6 | ..... | ..... | | ..... | ..... |
| 3 | ÷ ..... | ..... | ..... | | ..... | = 9 × 6 + 8 |
| 4 | ÷ ..... | ..... | 14 | 5 | zero | ..... |
| 5 | 92 ÷ | ..... | 9 | | ..... | = 9 × + 2 |

**Note that** If the remainder is zero, then the divison is without a remainder.

**Example**

**Find the quotient of 3978 ÷ 234**

**Result:**

Estimating the quotient to check the reasonability of the answer

| | | | |
|---|---|---|---|
| dividened | ③978 | → | 4000 |
| divisor | ② 34 | → | 200 |

The reasonable estimation to the quotient is 20

Do the division:

**The tens digit**

234 × ___ < 397 < 234 × ___

234 × 1 < 397 < 234 × 2

**The units digit:**

234 × ___ < 1638 < 234 × ___

234 × [7] = 1638

```
      1 7
234 | 3978
    - 234
      1638
    - 1638
      0000
```

3978 ÷ 234 = 17 **The quotient is close to the estimation. The answer is reasonable.**

## Exercises

**1** **Without doing the divison, choose the correct answer from the parentheses:**

(A) 11664 ÷ 216 = ..... (54 - 58 - 62 - 68 )

(B) 19708 ÷ 379 = ..... (48 - 52 - 54 - 62)

(C) 37440 ÷ 234 = ..... (160 - 170 - 200 - 190)

**2** **Find the quotient of the following:**

(A) 15345 ÷ 165 (B) 62160 ÷ 296 (C) 11183 ÷ 211 (D) 37961 ÷ 493

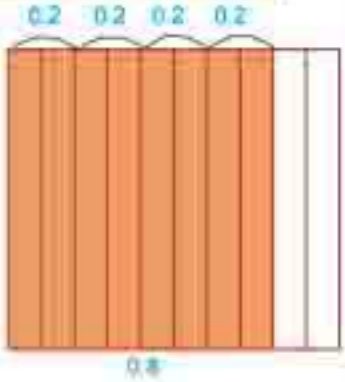
**3** The result of multiplying 2 numbers is 9088. If one of them is 284, find the other number.

**4** An owner of packing food factories wanted to pack 5904 kilograms of suger equally in 492 packs. What is the weight of each pack?

# 1-10

## (4) Division by a decimal fraction and by a decimal number

**First:** Divison by a decimal fraction without a remainder.




**Find the quotient of the following:**

**First:** $0.8 \div 0.2$

**Result:**

$$0.8 \div 0.2 = \frac{8}{10} \div \frac{2}{10}$$

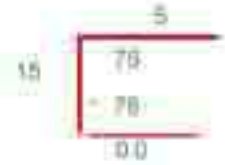
$$= \frac{8}{10} \times \frac{10}{2} = \frac{8}{2} = 4$$

**Second:** $0.75 \div 0.15$

**Result:**

$$0.75 \div 0.15 = \frac{75}{100} \div \frac{15}{100}$$

$$= \frac{75}{100} \times \frac{100}{15} = \frac{75}{15} = 5$$




**Draw the hundreds chart and illustrate the operation of divison on it.**

$$0.75 \div 0.15 = \frac{0.75}{0.15}$$ **(Both the dividend and the divisor can be multiplyed by 100 to make the denominator an integer)**

$$= \frac{0.75 \times 100}{0.15 \times 100} = \frac{75}{15} = 5$$

### You will learn

- To divide a decimal fraction by a decimal fraction.
- To divide a decimal number by a decimal fraction.
- To find the quotient of infinite divison to the nearest tenth or nearest hundredth.

### Key Terms

- Infinite division

**Example**

**Find the quotient in each of the following:**

(A) 4.86 ÷ 0.9 (B) 4.384 ÷ 0.32

**Result:**

(A) To find the quotient of 4.86 ÷ 0.9 make the divisor an integer by multiplying both of the dividened and the divisor by 10

```
      5.4
9 | 48.6
    45
    ----
      36
      36
    ----
      00
```

**The quotient** $= \frac{4.86 \times 10}{0.9 \times 10} = \frac{48.6}{9} = 5.4$

**Find the quotient of 3978÷ 234**

**Estimation** 4.86 - 5 The estimation is (5)

0.9 - 1 The answer is acceptable

(B) To convert the divisor into an integer, multiply both the dividened and the divisor by 100

**The quotient** $= \frac{4.384 \times 100}{0.32 \times 100} = \frac{438.4}{32} = 13.7$

```
      13.7
32 | 438.4
   | .32
     ----
      118
      . 96
     ----
       224
       . 224
      -----
        000
```

**Estimation:**

The dividened (4) 384 - 4

The divisor 0.(3)2 - 0.3

The estimated quotient $\frac{4 \times 10}{3}$ - 13

**Therefore, the answer is accaptable**

## Practice

(1) Divide 0.1932 ÷ 0.92 and check reasonability of the quotient.

**Result:**

$0.1932 \div 0.92 = \frac{0.1932 \times}{0.92 \times}$

$= \frac{\quad}{92}$

$=$ .....

**Estimation:**

**The dividened** 0.1932 ≈ 0.2

**The divisor** 0.92 ≈ ....

**The estimated quotient** ..... Answer .....

**2** **Without doing the division, estimate the quotient in each of the following:**

(A) 8.018 ÷ 0.19 (B) 6.235 ÷ 0.58

**Check the reasonability of your estimation using your calculator.**

## Practice

**1** **Find the quotient in each of the following:**

(A) 0.416 ÷ 0.8 (B) 0.0874 ÷ 0.46

(C) 1.155 ÷ 0.35 (D) 36.18 ÷ 0.09

(E) 357 ÷ 0.7 (F) 0.7595 ÷ 0.31

**2** **Find the quotient in each of the following:**

(A) (92.36 - 63.25) ÷ 0.41

(B) (19.645 - 4.73) ÷ 0.38

**3** **Find a number when multiplied by 0.64, then the result is 075.52**

**4** **Which of the following relations is true and which is false? what do you conclude?**

(A) 3.6 × 1.3 = 1.3 × 3.6

(B) 0.8 ÷ 0.04= 0.04 ÷ 0.8

**5** A bundle of paper has a height of 4.5 cm. If all its papers were of equal thickness where the thickness of each paper was 0.090 milimeters, find how many papers does the bundle include?

## Second: division by a decimal number without having a remainder

**Example**

**Find the quotient of each of the following:**

(A) 3.375 ÷ 13.5 (B) 77.728 ÷ 6.94

**Then discuss the reasonability of your answer.**

**Result:**

(A) 3.375 ÷ 13.5 = 33.75 ÷ 135

3.375 → 3 The estimated quotient is 0.3

13.5 → 10 The quotient is 0.25

the quotient is close to the estimation. Therefore, the answer is reasonable.

```
        0.25
135 ) 33.75
      -27 0
      675
      -675
      000
```

(B) 77.728 ÷ 6.94 = 7772.8 ÷ 694

= 11.2

Estimation: 7(7),728 → 80

(6),94 → 7 → $\frac{80}{7}$ = 11

The quotient is close to the estimation. Therefore, the answer is reasonable.

```
        11.2
135 ) 777.28
      -694
      832
      -694
      1388
      1388
      0000
```

## Practice

**1** Convert the following to the decimal forms.

(A) $\frac{3}{4}$ = ____ 4 ) 3.00

(B) $\frac{1}{8}$ = ____ 8 ) 1.00

(C) $\frac{7}{40}$ = ____ 40 ) 7.00

(D) $\frac{4}{25}$ = ____

**2** **Complete the following to estimate the quotient in each of the following operations:**

(A) $\frac{7.56 \times 4.2}{15.7}$ The estimation = $\frac{8 \times __}{16}$ = ...

(B) $\frac{9.8 \times 9.7}{4.6 \times 4.8}$ The estimation = $\frac{__ \times __}{__ \times __}$ = ...

**3** **Find the quotient of each of the following:**

(A) 2.67 ÷ 1.2

(B) 0.171 ÷ 1.9

(C) 65.7 ÷ 6.57

(D) 7.452 ÷ 621

(E) 38.64 ÷ 8.4

(F) 21.528 ÷ 93.6

**4** **Find the result:**

(A) (25.42 ÷ 3.1) + 1.8

(B) 3.62 - (55.25 ÷ 32.5)

**5** The length of a roll of cloth is 53.55 meters. It was divided into equal parts where the length of each part is 3.15 meters. Find the number of these parts.

**6** **Without doing the mathematical operations, estimate the result of each of the following:**

(A) (5.3 × 11.2) ÷ 2.1

(B) (20.9 ÷ 7.1) × 5.2

**7** **Find the quotient:**

(A) 94.5 ÷ 3.5

(B) 2.64 ÷ 0.2

**Third: Finding the quotient of infinite division to the nearest tenth and nearest hundredth.**

**Example**

**Write down each fraction in the decimal form:**

(A) $\frac{3}{8}$ (B) $\frac{2}{3}$ to the nearest hundredth

**Result**

(A) **To convert from a common fraction to a decimal fraction:**

**divide 3 ÷ 8**

**Note that the divison has no remainder. Therefore, we say the divison is finite.**

```
      0.375
8 ) 3.000
    - 24
      60
    - 56
      40
    - 40
       00
```

(B) **To find $\frac{2}{3}$ in the form of a decimal fraction:**

**divide 2 ÷ 3**

**Note that: in that case, the divison has a remainder. Therefore, we call it infinite divison.**

```
      0.666
3 ) 2.0000
    - 18
      20
    - 18
      20
    - 18
       2
```

We can continue on divison. However, the required is to find the quotient approximated to the nearest hundredth. Therefore, it is enough to divide till we have three decimal digits, then we apply the rules of approximation.

$\frac{2}{3}$ = **0.67 to the nearest hundredth.**

## Practice

**Complete:**

(A) $\frac{7}{3}$ = ..... to the nearest $\frac{1}{10}$

(B) $\frac{5}{9}$ = ..... to the nearest $\frac{1}{100}$

(C) $\frac{3}{11}$ = ..... to the nearest $\frac{1}{100}$

(D) $\frac{9}{7}$ = ..... to the nearest $\frac{1}{10}$

**Example**

**Find the quotient of 546.8 ÷ 53 to the nearest tenth.**

**Result:**

estimated quotient

$$\frac{546.8}{53} \approx \frac{500}{50} \approx 10$$

- **Find the tens digit: 53 × 1 < 54 < 53 × 2**
  Then, write it above the tens digit
- **Find the units digit:**
  **Note that 16 < the divisor. Therefore, the units digit = zero.**
- **Place the decimal point in its original position.**
- **Find the tenth digit** 53 × 3 < 168 < 53 × 4
  **Then, write it above the tenth digit.**
- **Find the hundredth digit 53 × 1 < 90 < 53 × 2**
  **Then, write it above the hundredth digit.**
  It is enough to divide until you get 2 decimal digits because it is required to approximate the quotient to the nearest tenth.

∴ 546.8 ÷ 53 = 10.3 **to the nearest tenth.**

**Note that: the estimated quotient is close to the actual quotient.**

**Therefore, the answer is reasonable.**

## General Exercises

**1** **Divide the following then approximate the quotient to the nearest $\frac{1}{10}$**

(A) $53.27 \div 2.1$

(B) $24.31 \div 9.07$

(C) $1.623 \div 0.152$

(D) $12.46 \div 0.517$

**2** Find the results and approximate them to the nearest hundredth.

(A) $7.034 \div 1.7$

(B) $1.775 \times 0.15$

(C) $(3.425 + 1.07) \div 2.8$

(D) $7.52 \div (14.73 - 11.58)$

**3** **Place a sutible sign (> , < or =):**

(A) $0.46 \div 4.6$ ☐ $0.01$

(B) $17.17 \times 1.7$ ☐ $39$

(C) $53.7 \div 3.5$ ☐ $5.37 \div 0.35$

(D) $845 \div 4.9$ ☐ $(84.5 \div 49) \times 0.1$

**4** **Find the quotient in each of the following:**

(A) $9.568 \div 9\frac{1}{5}$

(B) $2\frac{1}{8} \div 0.125$

(C) $2\frac{3}{25} \div 0.012$

(D) $\frac{17}{40} \div 0.85$

**5** The area of a rectangle is $9.43cm^2$, and its width is 2.45cm.Find its length and approximate it to the nearest hundredth of centimeter.

**6** **Fill in the blanks:**

(A) $4.25 \div$ ___ $= 8\frac{1}{2}$

(B) ___ $\div 9 = 4.5$

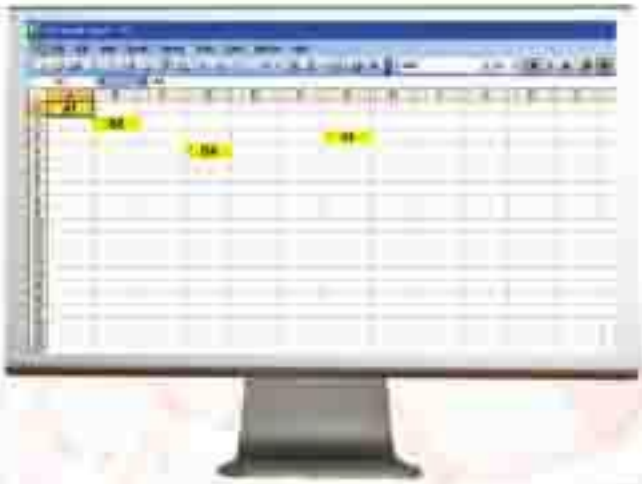
7. Find the quotient of 458.62 ÷ 35.2 to the nearest hundredth.

8. Divide 375 by 0.5 then add $5\frac{1}{4}$ to the quotient.

9. The area of a rectangle is 10.25 square meters, and its length is 4.1 meters. Find its width and perimeter.

10. The side length of a square is 5.06 meters. Find its area approximating it to the nearest hundredth.

# Technology



**How do you deal with Excel?**

Click the start menu, then choose programs. On programs click on office, then choose Excel (the spread sheets). A table will appear on the monitor, it is divided into rows and columns. Each space within the table is called a cell. For example, $B_2$ denotes the element located in row number 2 and column B while cell $D_4$ denotes the element located in the row number 4 and the column D.

**Example: Use the spead sheets program (Excel) to find the quotient of** $0.75 \div \frac{7}{8}$

1. Enter the number 0.75 in cell $A_1$, then enter the number 7 in cell $C_1$ and 8 in cell $D_1$.

2. Do a mouse click on cell $G_1$ and write = then click on $C_1/D_1$ and press Enter.

3. Do a mouse click on cell $J_1$ and write = then click on $A_1/G_1$ and press Enter. The quotient appears.

**Find by yourself:**

$0.75 \times \frac{7}{8}$

**(Note that the multiplication symbol is (*) and division symbol is (/).**

**To find the sum of :** $0.75 + \frac{7}{8}$

Do a mouse click on cell $K_1$ and write = then write $A_1 + G_1$ and press Enter. The quotient appears.

# Activity

## History Tip

**Giza pyramids were built more than 5000 years BC. Khufu pyramid is the largest one as it has a height of 146 meters, where the base area is as equal as the area of 10 football playgrounds.**

1. Each stone used in buliding the pyramid weighs about 3.2 tons. What is the weight of 108 stones in kilograms?

2. Some huge stones used in buliding the pyramid weigh 15.3 tons each. If an elephant weighs 3 tons, what is the number of elephants which the total of their weight is equal to the weight of one stone?

3. If the process of glazing each stone in a pyramid takes 25 minutes. Will the process of glazing 8 stones take 3 hours? Explain.

**Use the knowledge resources (i.e., library, Internet, ....) to write a ten-line paragraph about Giza pyramids.**

Test

# Unit Test

1. Find the results of each of the following operations approximating them to the nearest hundredth.

   A. 65.384 + 63.427

   B. 729.72 - 122.743

   C. 75.32489 × 100

   D. 26.4392 ÷ 10

2. A truck can hold 125 boxes of oranges at a time. How many times are needed to deliver 4375 boxes by that truck?

3. A. Which is greater $\frac{9}{16}$ or 0.5734? Find the difference between the two fractions.

   B. Find a number that if multiplyed by 0.37, then the result is 17.8932.

4. A. Rearrange the following fractions descendingly : $\frac{1}{2}$ , 0.8 , $\frac{1}{4}$ , 0.3

   B. The length of a rectangle is 25.4cm while its width is 18.09cm. Find its perimeter and its area.

unit 2

2

# Sets

# 2-1

## What is a set?

**You will learn**

- To define the mathematical concept of a set.

**Key Terms**

- The set
- The elements of a set

**Think and discuss**

| Monday | |
|---|---|
| 31 | 10 |
| Aug. 2009 | Ramadan 1430 |

1. What are the days of the week? The days of the week are: Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday and Friday.
2. What are the letters of the word "Hosam"? The letters of the word Hosam are : H, O, S, A, M.
3. What are the digits of the number 71536? The digits of the number 71536 are: 7, 1, 5, 3, 6.

All of the above collections are called "A set" So, we say:

**The set of the days of the week, the set of the letters of the word "Hosam" and the set of the digits of the number 71536 .**

**The set:** it is a collection of known objects that are clearly defined, and they have a certain property in common.

**Note that** The beautiful flowers in your school garden do not form a set since the property of beauty differs from a person to another.

**The elements of a set**

The set of the letters forming the word "Magdy" are:

M, A, G, D, Y. Each letter is called an element of the elements in the set of the letters forming the word Magdy.

**Practice**

1. The set of the colors that appear in the traffic signal has the following elements: Red, and

**2** **Complete:** In the following figure, the set of the means of transportation has the following elements: the plane, the train, ..... and .....

## Exercises

**1** **Complete the following table as illustrated in the example:**

| The expression | A set/not a set |
|---|---|
| The months of the Hegri year | a set |
| The tall students in your class. | Not a set |
| The seasons of the year | |
| The letters of the word "Egypt" | |
| The beautiful stories | |
| The prime numbers between 5 and 25 | |

**2** **write down all the elements in the following sets:**

| The set | The elements |
|---|---|
| The set of the digits in the number 3072 | |
| The set of the colors in Egypt's flag | |
| The set of the days in the week | |
| The set of the year's months that have less than 30 days | |
| The set of 2-digit numbers and each is like the other | |
| The set of the months in the Hegri year | |

# 2-2

## Mathematical expression of a set

**You will learn**

- To write a set if you know its elemants.
- To express a set using the listing method.
- To express a set using the description method.
- To represent the sets using a Venn diagram.

**Key Terms**

- The listing method.
- The description method.

### First: The listing method

To express a set, write all the elements of the set between two braces {.....}, then place the mark "," between every two elements. The set is symoblized by one of the alphabetic letters written in capital font like: X, Y, Z, .....

**Examples**

1. Write down the set X where X is the set of the letters forming the word (Ahmed)

**Solution :**

X = {a, h, m, e, d}. It can be written also as:
X = {h, d, a, e, m}

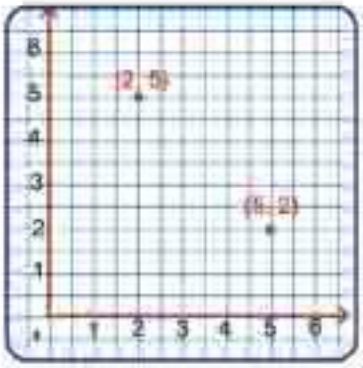
2. Write down the set Y where Y is the set of the digits in the number 1717.

**Solution :**

Y = {7, 1}. It can be written also as: Y = {1, ....}

**Note that**

1. It is not important to pay attention to the order of the elements when writing a set.
2. Any set does not have a repeated element.
3. In the opposite figure, the ordered pair (2,5) is different from the ordered pair (5,2) while the set {2,5} is the same as the set {5,2}



## Second: The description method

In that method, we define the property which distinguishes and determines the elements of a set.

**For example,** The set: {c, a, r, e} can be expressed as follows: The set of the letters forming the word care, or the set of the letters forming the word (race), or the set of the letters forming the word (acre).

It can be written in the following form: {x : x is one of the letters forming the word care}, and it is read as the set of all x where x is one of the letters forming the word care.

Write down the set X where x = {2, 3, 5, 7, 11, ...}. Use the description method.

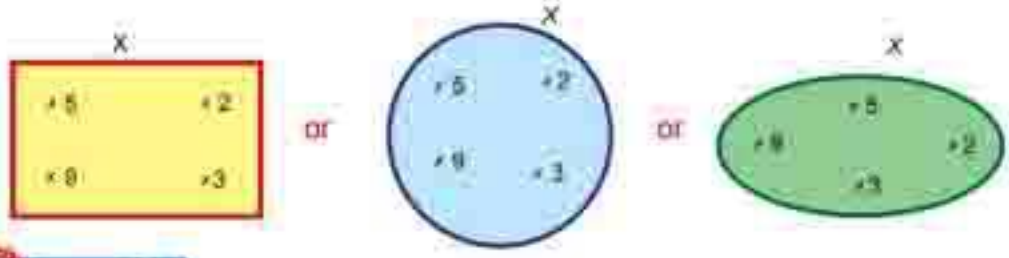
**Complete the table to express the following sets:**

| The Listing Method | The Description Method |
|---|---|
| {c, a, r} | The set of the letters forming the word car |
| {east, west, north, south} | |
| {  } | The set of the colors forming Egypt's flag |
| {  } | The set of the digits in the number 46421 |
| {Abo Bakr, Omar, Othman, Ali} | |
| | The set of the letters of the word (Series) |
| {2, 4, 6, 8, 10} | |
| {1, 3, 5, 7,  } | |
| {0, 2, 4, 6, 8,  } | |

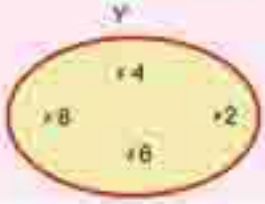
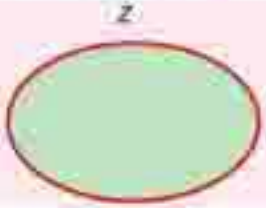
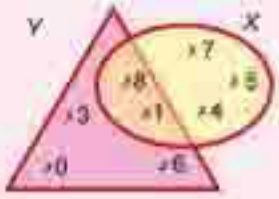
## Representing sets using Venn diagrams

Scientist Jan Venn, could represent every element in a set by placing a point or an (X) mark in any closed geometric shape such as (a triangle, a circle, a rectangle, .... etc),

**For example:** The set X = {2, 3, 5, 9} can be represented by using a Venn diagram as follows:



**Complete the following table:**

| The set | Venn diagram |
|---|---|
| X = {2, 5, 8} | |
| The listing method Y = { ..... }<br>The description method is ..... |  |
| Z = the set of the letters forming the word (Stairs) |  |
| X = ( ..... )<br>Y = .....<br>The set of the elements found in X and Y is ..... |  |

2-3

# Belonging of an element to a set

If the football team of your class consists of Samy, Hatem, Khaled, Yasser, Hany and Maher. Write down the set X which represents the football team of your class.

X = {.....}

1. Is Khaled one of the players of the football team of your class?
2. Is Khaled an element of the elements of the football team in your class? We can say that Khaled belongs to the set of the football team in your class.

This can be symblized as follows: Khaled ∈ X

Similarly, Samy ∈ X, Hatem ∈ X, ... and so on.

The symbol ∈ denotes "the belonging of an element to a set

**Note that**

**Ahmed is not a player in that team so, Ahmed does not belong to X, This is symbolized as Ahmed ∉ X.**

The symbol ∉ denotes "The not belonging of an element to a set

**Example:** **If Y = {4, 5, 7, 9, 11},**

**Then 4 ∈ Y, 5 ∈ Y and 11 ∈ Y,**

**while 8 ∉ Y and 12 ∉ Y.**

**If 3 ∈ {2, x} Then x = .....**

**You will learn**

- Belonging of an element to a set
- Not-belonging of an element to a set.

**Key Terms**

- Belonging ∈
- Not belonging ∉

## Exercises

**1** Write each of the following sentences using one of the symbols ∈ or ∉.

| The sentence | The symbol |
|---|---|
| 6 is an element of the set X | 6 ∈ X |
| 5 belongs to the set Y | |
| 8 does not belong to the set M | |
| 7 does not belong to the set N | |
| 8 is an element of the set K | |

**2** If X is a set where X = {2, 3, 5, 6}

Place the suitable symbol ∈ or ∉ in the blanks to make each sentence true:

(A) 3 ..... X (B) 5 ..... X (C) 7 ..... X (D) 6 ..... X

(E) 0 ..... X (F) 2 ..... X (G) 1 ..... X (H) 32 ..... X

**3** Place the suitable symbol ∈ or ∉ in the blanks to make each sentence true:

(A) 2 ..... {3, 1, 7}

(B) Y ..... the set of the letters forming the letters of the word Egypt.

(C) 3 ..... The set of the odd numbers

(D) 7 ..... the set of the days of the week

(E) The month march ..... the set of the seasons of the year

(F) 3 ..... {13, 33, 330}

**4** Fill in using a suitable number:

(A) If 4 ∈ { 2, x, 5 } Then x = .....

(B) If 5 ∈ { 7, 9 , x } Then x = .....

(C) If 5 ∈ { 3, 4 + x } Then x = .....

(D) ..... ∈ {3, 5, 10} and belongs also to the set of the prime factors of the number 6.

# 2-4

## Types of sets

**Think and discuss**

How many elements are there in the set X = {a, h, m, e, d}?

The number of the elements in the set X = .....

So, we call that set a finite set.

### The finite set

**It is a set that has a limited number of elements.**

**i.e., the number of its elements can be listed.**

**Similarly** The set X = {g, b, r} **is a finite set that has** three elements.

The set Y = the set of the days of the week is also a finite set that has 7 elements.

### The infinite set

**It is a set that has an unlimited number of elements i.e., the number of its elements can not be listed.**

**For example:** The set of the even numbers {0, 2, 4, 6, ....} is an infinite set because the number of its elemetns can not be listed.

Similarly, The set of the decimal numbers between 2 and 3 **is an infinite set where some of its elements are** 2.1 , 2.534 , 2.91 , .....

### The null set

**It is a set that has no elements. It is denoted by the symbols { } or ø and read as (Fai).**

**For example:** The set of the students in your class that are 30 years old or the set of the months in a year that have 35 days.

**You will learn**

- Finite set
- Infinite set
- Null set (empty set)

**Key Terms**

- Finite set
- Infinite set
- Null set ø

**Note that**

**The null set** is a **finite set** in which the number of its elements = zero.

**The set** { } has a number of elements that is equal to zero, while the set {0} has a number of elements that is equal to 1 **and it is not a null set.**

## Exercises

**1** Which of these sets is a finite set and which of them is an infinite set. Write the elemetns of every finite set:

| The set | finite | Number of elements | Infinite |
|---|---|---|---|
| The set of the days in a week | ✓ | 7 | ✗ |
| The set of the months in a gregorian year | | | |
| The set of the odd numbers | | | |
| The set of the prime numbers less than 20 | | | |
| The set of the letters forming the word (sondos) | | | |
| The set of the factors of the number 3 | | | |
| The set of the alphabets in the English language | | | |

**2** Which of these sets is a null set and which of them is not a null set:

A The set of students in your class who made a trip to the moon. ( )

B The set of the Egyptian governorates in Asia. ( )

C The set of those numbers divisible by 7 and are between 8, 15. ( )

D The set of the factors of 15 which are divisible by 2. ( )

E The set of those numbers divisible by 5 and are between 5, 10. ( )

F The set of the governorates in upper Egypt that are located on the Mediterranean sea. ( )

# 2-5

## Equal sets

**Complete:** The set of the letters forming the word (Magd) are..... The set of the letters forming the word (Gmad) are.....

What do you observe ?

If the set X = {2, 3, 7} and the set Y = {7, 3, 2} **What do you observe in those two sets?**

**Note:** **Do not pay attention to the order of the elements in a set.**

**We observe that the elements of the set X are the same elements in the set Y**

**The set X = The set Y**

**If the two sets have the same elements exactly**

If X is the set of the letters forming the word (month) while, Y is the set of the letters forming the word (months). Are the two sets equal? State the reason.

**Example**

**Find the values of a and b that make each sentence true.**

1. {a, 7} = {b, 2}
2. {5, a, 8} = {b, 9, 8}
3. {3, 6, a} = {6, 3, 4}

**Solution:**

1. {a, 7} = {b, 2} **when** a = 2 , b = 7
2. {5, a, 8 } = {b, 9, 8} **when** a = 9 , b = 5
3. {3, 6, a} = {6, 3, 4} **then** a = 4

**You will learn**

- Equality of two sets

**Key Terms**

- Equality of two sets

## Exercises

**1** Put (✓) for the true sentence and (✗) for the false one:

- (A) {1, 2, 5} = {21, 5} ( )
- (B) {a, r, c} = the set of the letters forming the word (car) ( )
- (C) {1, 2, 3, 6 } = the factors of the number 6. ( )
- (D) {x, 2, 5} = {2, 5, 3} where x = 3. ( )

**2** If X = the set of the letters forming the word (lab), Y = the set of the letters forming the word (ball), is X = Y?

**3** If {x, 2, 7} = the set of the digits in the number 2257, find the value of x.

**4** Match the equal sets in the following columns.

| | |
|---|---|
| {6, 8, 9} | the set of the letters forming the word (ziwel) |
| {10, 12, 14, ... 98} | the set of the digits of 9688 |
| {3, d} | (Summer, winter, spring, autumn) |
| {z , l, e, w, L} | the set of the months in a year that have 35 days |
| the set of the seasons of the year | {d, 3} |
| ∅ | the set of the even numbers that have 2 digits. |

**5** place (✓) for the true sentence and (✗) for the false sentence:

- (A) {0, 2, 4, 6}= the set of the even numbers less than 6. ( )
- (B) {77, 99} = the set of the digits of 9977 ( )
- (C) {3, 6, 9, ...}= the set of the counting numbers that are divisible by 3. ( )

# 2-6

## Inclusion and subsets

If X = the set of the letters forming the word (pie) and Y= the set of the letters forming the word (pier).

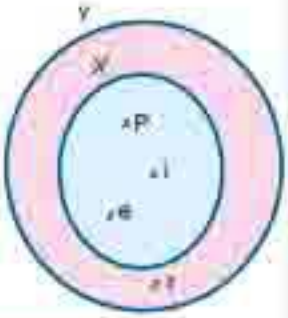
Write each of the two sets using the listing method.

X = {p, i, e} , while Y = {p, i, e, r}

**Are all the elements of the set x found in the set Y? Draw a Venn diagram which represents the two sets X and Y.**

**Yes, all the elements of the set x are found in the set y.**

So, we say:




**X is a subset of Y.**
**(or) X is included in Y**

**This is denoted by:** $X \subset Y$
**The symbol $\subset$ denotes the inclusion of one set in another set**

If X = {1, 2}, Y = {2, 3, 4, 5}. Is $X \subset Y$?

**we note that:** $1 \in X$ **while** $1 \notin Y$

Therefore X is not a subset of Y because all the elements in X are not included in Y, so we say that X is not a subset of Y:

**X is not included in y**

**and that is written as** $X \not\subset Y$

**where the symbol $\not\subset$ denotes the non inclusion of a set in another set.**

**you will learn**

- Inclusion
- Non inclusion
- Subsets

**Key Terms**

- Inclusion $\subset$
- Non inclusion $\not\subset$
- Subsets

## Examples

**1** **Fill in the blanks using one of the two symbols $\subset$ or $\in$ to make each sentence true:**

(A) {1, 2} {1, 2, 3} (B) {7} {77} (C) {7, 8} {7, 9, 11} (D) {2} {2}

**Solution:**

(A) $\{1, 2\} \subset \{1, 2, 3\}$

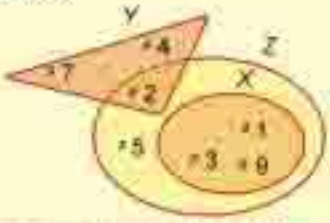
(B) $\{7\} \in \{77\}$ as the first set has only one element which is 7 while the second set has only one element which is 77.

(C) $\{7, 8\} \not\subset \{7, 9, 11\}$ **because** $8 \in \{7, 8\}$ while $8 \notin \{7, 9, 11\}$

(D) $\{2\} \subset \{2\}$ **i.e., any set X is a subset of itself** $X \subset X$

**2** **In the opposite Venn diagram:**

write X, Y and Z, **using the listing method, what do you observe?**




**Solution:**

X = {1, 3, 9}, Y = {2, 4, 7} and Z = {1, 9, 3, 2, 5}

**Note that**

- $X \subset Z$ while $Y \not\subset Z$
- **The symbols** $\subset$ and $\not\subset$ **refer to the relation between a set and another set while the symbols** $\in$, $\notin$ **refer to the relation between an element and a set.**
- **The null set is a subset of any set i.e.,** $\varnothing \subset X$, $\varnothing \subset Y$ and $\varnothing \subset Z$

**3** **Write down all the subsets of X = {1, 2, 3}:**

**Solution:** the subsets are:

- The null set $\varnothing$.
- **The sets which have one element each**: {1}, {2} and {3}.
- The sets which have 2 elements each: {1, 2}, {1, 3} and {2, 3}.
- The sets which have 3 elements each: {1, 2, 3} = X

**4** **Write down all the subsets in each of the following sets:**

(A) X = {3} (B) Y = {5, 6}

**Solution:**

(A) The subsets of the set X are : $\varnothing$ and {3}

(B) The subsets of the set Y are : $\varnothing$, {5}, {6} and {5, 6}

## Exercises

**1** **Complete the table:**

| Set X | Set Y | Use ⊂ or ⊄ |
|---|---|---|
| {7, 9, 10} | {6, 7, 8, 9, 10} | X ..... Y |
| {a, b, c} | {a, b, d, e} | X ..... Y |
| {1, 2, 3} | The set of the prime numbers | X ..... Y |
| The letters of (Ragb) | the letters of (Gabr) | X ..... Y |
| {January, March} | The months of the gregorian year | X ..... Y |
| {London} | The set of the capitals of all the world's countries | X ..... Y |

**2** **Look at the opposite Venn diagram, then complete the following using one of the symbols ⊂ , ⊄ , ∈ or ∉**

(A) y ..... X

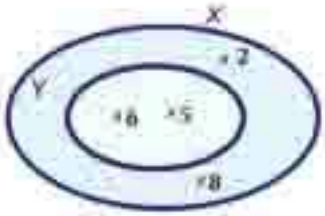
(B) 2 ..... X

(C) {5} ..... Y

(D) 6 ..... Y

(E) 4 ..... X

(F) {6, 8} ..... X




**3** **Find the subsets for each of the following sets:**

(A) {8}

(B) {∅}

(C) {3, 5, 9}

(D) {99}

(E) The set of the letters forming the word (bibl).

**4** **State whether each sentence is true or false:**

(A) {0} ⊂ {100}

(B) {100} ⊂ {0, 10}

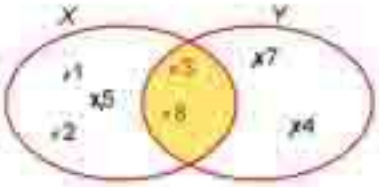
(C) ∅ ⊂ {0}

(D) 9 ∈ {99}

# 2-7

## Intersection of two sets

**Think and discuss**




**Look at the opposite Venn diagram and complete**

X = { }

Y = { }

**Are there any common elements in the sets X and Y? What are they?**

**Yes,** there are common elements in the two sets X and Y where

$3 \in X$ , $3 \in Y$ , similarly $8 \in X$ and $8 \in Y$

**i.e.** each of the two elements 3 and 8 belong to the two sets X and Y.

Therefore, {3, 8} is the set of the intersection of the two sets X and Y. This relation is written as $X \cap Y = \{3, 8\}$

**The intersection of two sets** = the set of all Common elements in the sets X and Y

**In the above Venn diagram that represents the two sets,**

$X \cap Y$ is represented by the colored section

**You will learn**

- To find the intersection of two sets.

**Key Terms**

- Intersection of two sets ($\cap$)

**Examples**

**1** **If X = {1, 2, 3, 4, 5},**

**Y = {the set of the digits of 6315}**

**Represent the two sets X and Y by a Venn diagram, then find: $X \cap Y$ and $Y \cap X$, what do you observe?**



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**Solution:**

X = {1, 2, 3, 4, 5} Y = {5, 1, 3, 6}

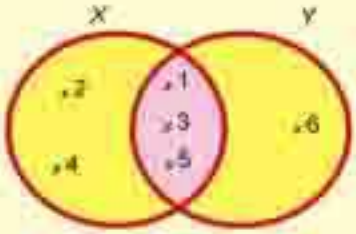
X ∩ Y= {1, 3, 5}

Y ∩ X= {1, 3, 5}

**From the above, we notice that:**

**X ∩ Y = Y ∩ X**

**(The commutative property)**



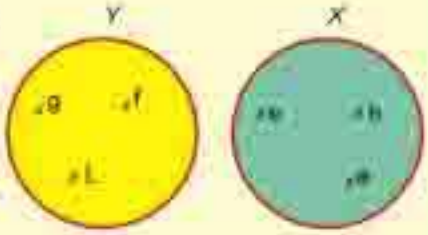

**2** **Use a Venn diagram to represent the two sets: X = {a, b, e},**

**Y = the set of the letters forming the word (fig) then find: X ∩ Y and Y ∩ X**

**Solution:**

We notice that there are not common elements in x and Y So, we say X and Y are two disjoint sets.

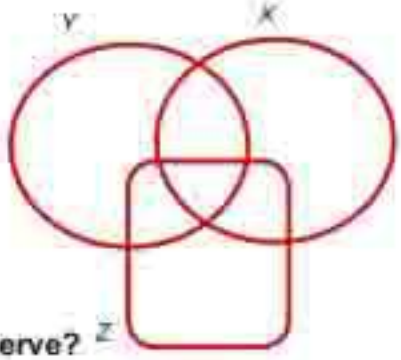
then X ∩ Y = ∅ Y ∩ X = ∅



**if X = {1, 2, 3} find X ∩ ∅.**

## Exercises

**1** **In the opposite Venn diagram:**




A Color **X ∩ Y** in red.

B **Color X ∩ Z** in green.

C **color Y ∩ Z** in yellow.

D **Find: (X ∩ Y)∩ Z and X ∩(Y ∩ Z), what do you observe?**

**2** **Complete:**

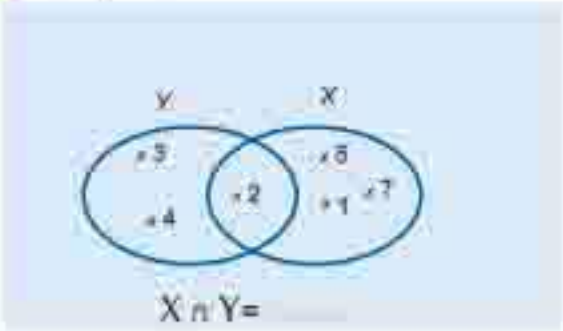
A {5, 6} ∩ {4, 5} = .....

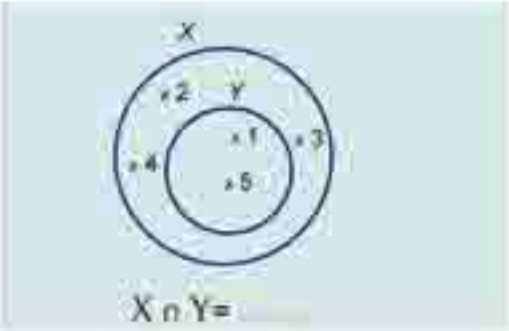
B {1, 2, 9} ∩ {1, 2, 4, 9} = .....

C {1, 7, 14} ∩ {2, 14,1} = .....

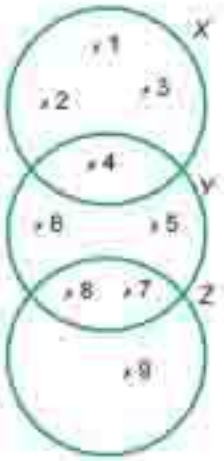
D {3, 2, 5} ∩ {4, 23, 55} = .....

**3** **Complete:**




**4** **Look at the opposite Venn diagram and write down X, Y and Z using the listing method, then find the following:**




(A) X ∩ Y= .....

(B) X ∩ Z= .....

(C) Y ∩ Z=.....

(D) {5, 6, 7, 8} ∩ Z = .....

(E) {3, 2} ∩ X = .....

(F) {2, 5, 8} ∩ Y =. .....

**5** **Place the suitable symbol ∈ ,∉, ⊂ or ⊄ to make each of the following sentences true:**

(A) If X = {1, 2, 3} ∩ {2, 4, 6} then 3 ..... X

(B) If Y = {2, 3, 5} ∩ {1, 3, 5} then {1, 2, 3, 5} ..... Y

(C) If Z = {3, 4, 5} ∩ {2, 3, 4} then 4 ..... Z

(D) If R = {2, 5, 6} ∩ {3, 5} then R ..... {2, 5}

(E) If M = {5, 2, 3} ∩ {1, 5} then M ..... {2}

**6** **If X = {1, 2, 3}, Y = {2, 3, 5, 6} and Z = {1, 2, 5}. Represent each of X, Y and Z using a Venn diagram, then find the following:**

**First:** (X ∩ Y) ∩ Z **Second:** X ∩ (Y ∩ Z)

**What do you observe?**

# 2-8

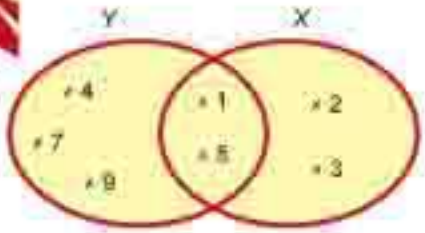
## Union of two sets

**Think and discuss**

**Look at the opposite Venn diagram and complete:**

X = { }

Y = { }




The set that has all the elements in X or Y or in X and in Y is = {...}

The union of the two sets X and Y is represented by the colored section in Venn diagram. This relation can be written as $X \cup Y$

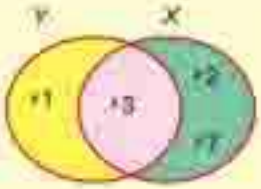
**The colored section represents the set which includes all the elements in X or Y or both of them.**

The set of elements which belongs to x or to Y is called the union of the two sets X and Y. It is written as:

$X \cup Y = \{1, 2, 3, 4, 5, 7, 9\}$

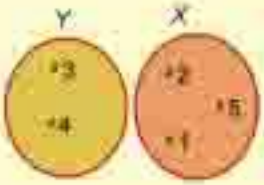
**Example**

**Find each of $X \cup Y$ and $X \cap Y$ in the following cases:**



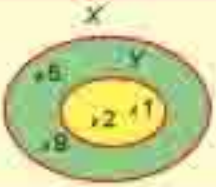

$X \cup Y = \{2, 7, 3, 1\}$

$X \cap Y = \{3\}$




$X \cup Y = \{1, 2, 5, 3, 4\}$

$X \cap Y = \varnothing$




$X \cup Y = \{1, 2, 5, 9\} = X$

$X \cap Y = \{1, 2\} = Y$

Notice that $Y \subset X$

**You will learn**

- To find the Union of two sets.

**Key Terms**

- Union of two sets ($\cup$)

## Practice

Given that X = {1, 2, 3, 4} and Y = {4, 5, 6}. Find X ∪ X, X ∪ ∅, X ∪ Y and Y ∪ X, What do you observe?

## Exercises

**1 Complete:**

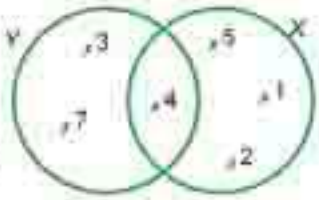
(A) {2} ∪ {4} = .....

(B) {1, 5} ∪ {1, 3} = .....

(C) {1, 2, 12} ∪ {2, 3, 12} = .....

(D) {1, 4, 6} ∪ ∅ = .....

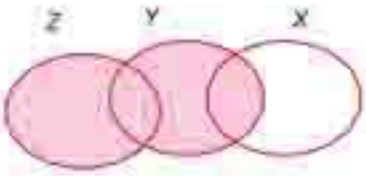
**2** Look at the opposite Venn diagram, then find X ∪ Y and Y ∪ X . What do you observe?




**3** Given that X = {1, 2, 3}, Y = {2, 3, 5, 6} and Z = {1, 2, 5}

Find each of (X ∪ Y) ∪ Z and x ∪ ( Y∪ Z). What do you observe?

**4 In each of the following Venn diagrams, write what the colored section represents:**

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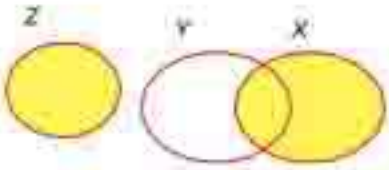


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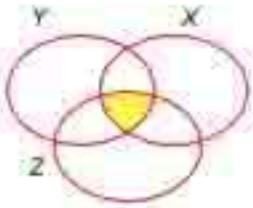


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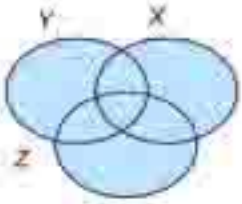


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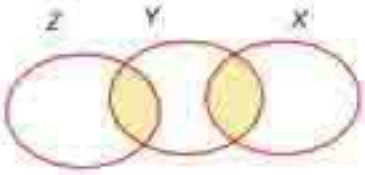


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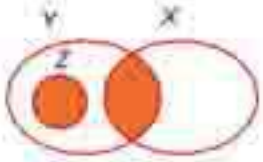


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2-9

# The Universal set

**If** x = The set of the football team in your class.
Y = The set of the basketball team in your class.
Then, we can choose a huge set that represents all the given sets in the problem where the given sets are subsets of it. That huge set is called the universal set and it is denoted by the symbol U.

**Example :** The universal set can be the set of the students in your class or the set of all the students in the fifth grade in the school or simply the set of all the students in the school.

**The univeral set** (U) is the mother set which includes all the given subsets.

The universal set may be represented by a rectangle on the Venn diagram while its subsets are represented by closed Curves inside the rectangle.

**Examples**

1 **If X = {Egypt, Libya, Sudan},**
**Y = {Sudan, Somalia}**
U is possibly the set of Arab countries.

**Think of** another description for the universal set U.

**You will learn**

- The universal set

**Key Terms**

- Universal set (U)

2 If X = {5, 7, 9, 11, .... }.

U is possibly the set of the odd numbers.

**Think** of another description of U.

## Exercises

The given sets in each of the following cases represent subsets, write down a suitable universal set for each case:

1. X = {Cairo, Helwan, 6th of October city},

   Y = {Sharqya, Alexandria}

   U= .....

2. X = The set of Math teachers at your school.

   Y = the set of science teachers at your school.

   U= .....

3. X = { 2, 5, 8}

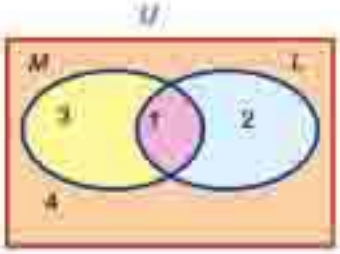
   Y = { 2, 3, 7, 8 }

   U= ..... (represent U by Venn diagram)

4. X = {Taha Houssen, Youssef Idrees, Tawfik Al-Hakeem}

   U= .....

5. The opposite Venn diagram represents the two sets L, M and the universal set U. If we give each different section within the Venn diagram one of the following numbers: 1, 2, 3, 4 . Can you represent the following sections using the two sets L, M and the symbols ∩ and ∪.




(A) Section 1 (B) Sections 2, 1 and 3

(C) Sections 1 and 3 (D) Sections 2 and 1



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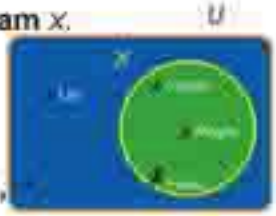
2-10

# The Complement of a set

**1** If the set of the music team at school is:

**U= {Magdy, Yasser, Fayez, Lila, Souad}**

**Then, the set of boys in the team** *x*.




X= {Magdy, Yasser , Fayez}

**Note that** $X \subset U$

**However, if the set of the girls is x' , then:**

X' = { ..... }

**Therefore, the set x' is the complement of the set x.**

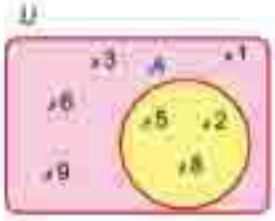
**Complete** $X \cup X' = ...$ , $X \cap X' = .....$

**2** If the universal set

**U** = {1, 2, 3, 5, 6, 8, 9}

and the set A = {2, 5, 8}

where $A \subset U$




Then, we call the set {1, 3, 6, 9} **The complement of the set A** with regard to the set U . That set is written as A' = {1, 3, 6, 9} and it is defined as a set of the elements in U that does not belong to the set A. It is denoted by the symbol A' and written as A' = {1, 3, 6, 9}

**The complement of a set A with regard to the set U is**

**A' where: $A \cup A' = U$ , $A \cap A' = \varnothing$**

**You will learn**

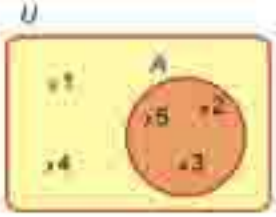
- To find the complement of a set.

**Key Terms**

- The complement of set X

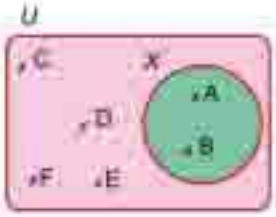
## Exercises

**1** **Look at the opposite Venn diagram then complete:**




U = ..... A = ..... A' = .....

**2** **Look at the opposite Venn diagram then complete:**

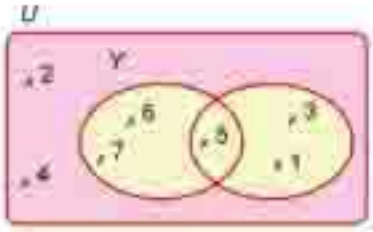



U = ..... X = .....

X' = ..... X ∩ X' = .....

X ∪ X' = .....

**3** **Look at the opposite Venn diagram then complete:**




U = ..... X = .....

Y = ..... X' = .....

Y' = ..... Y ∪ X = .....

Y ∩ X = ..... (Y ∪ X)' = .....

**4** If U is the set of the even numbers less than 16, A = { 4, 6, 10, 12} and B = {2, 6, 8, 14}. Find each of the following: A∪ B, (A ∪ B)' A ∩ B and (A ∩ B)'.

**5** If U is the set of the factors of 12 and A is the set of the factors 6, find A'.

**6** If U = { 1, 2, 3, 4, 5, 6}, X = {3, 4, 5} and Y = { 1, 2, 3}.

**Find each of the following sets:**

(A) X'  (B) Y'

(C) X ∩ Y  (D) (X ∩ Y)'

(E) X ∪ Y  (F) (X ∪ Y)'

(G) X' ∪ Y'  (H) X' ∩ Y'

# 2-11

## The Difference of two sets

**Think and discuss**

A survey has been applied on 10 students from class 5/1 showed that only 4 students read Al-Gomhoria newspaper. Those students are Ahmad, Sameh, Hanay, and Hanaa. However, only 3 students read Al-Akhbar newspaper. Those students are: Rana, Hossam, and Hany while two students read both the newspapers; Mona and Mahmoud, and only one student does not read any newspaper; Samir. This can be illustrated using the opposite Venn diagram.

X = {Ahmed, Sameh, Hanaa, Hanan, Mona, Mahmoud}

Y = {Mona, Mahmoud, Rana, Hany, Hossam}

The set of students who read Al-Gomhoria newspaper and do not read Al-Akbar newspaper is = {Ahmed, Sameh, Hanaa, Hanan}

i.e., The set of elements that belongs to X and does not belong to Y. This set is called (X difference Y) and it is written as X - Y

Complete: X - Y = {....., ....., ....., .....}

Y - X = {....., ....., .....} What do you observe?

**Note that**

**X - Y is not equal to Y - X**

**You will learn**

- To find the difference of two sets

**Key Terms**

- The difference of two sets (-)

**Think**

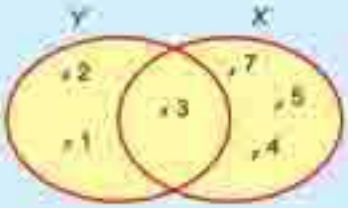
U - X = .....

U - Y = .....

**Note that**

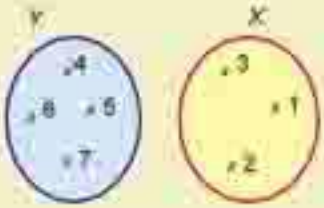
X - X = ∅ while X - ∅ = X

## Exercises



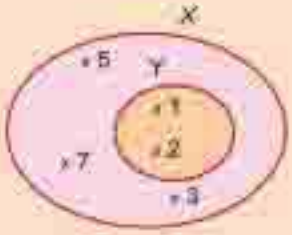

X - Y = .....

Y - X = .....



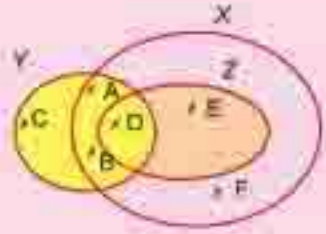

X - Y = .....

Y - X = .....




X - Y = .....

Y - X = .....




X - Y = .....

Y - X = .....

X - Z = .....

Z - Y = .....

## General Exercises

**1** Place the suitable symbol $\in$ , $\notin$ , $\subset$ or $\not\subset$ in the blanks:

A) 8 ..... {5, 7}

B) {3} ..... {1, 3, 2}

C) 2 ..... {22, 44}

D) {1, 2} ..... The set of prime numbers

E) $\varnothing$ ..... {0}

F) (X $\cap$ Y) ..... X

**2** Complete each of the following sentences to have a true sentence:

A) If X = {2, 3}, Y = {3, 5}, then X $\cap$ Y = .....

B) If {1, X} = {2, Y}, then X = ..... , Y = .....

C) If X $\subset$ Y, then X $\cup$ Y = ..... ; X $\cap$ Y = .....

D) {1, 2, 4} - {2, 4, 6} = .....

E) If 4 $\in$ {2, X, 7}, then X = .....

**3** Choose the true sentence from the parentheses:

A) {1, 7} ..... {0, 1, 2, 3, 4, ...} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

B) X - X = ..... ($\varnothing$ or zero or {0} or {1})

C) If {2, 5, 7} = {5, A, 2} then A = ..... (2 or 5 or 7 or 0)

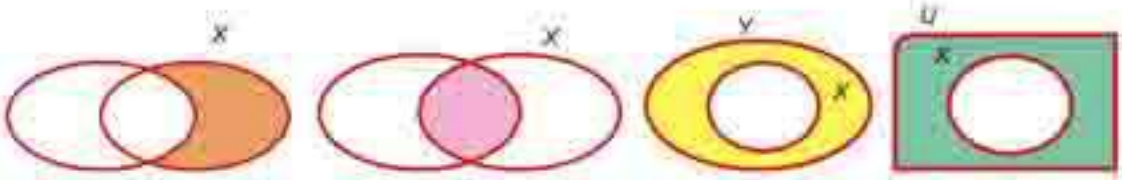
D) {5} - {1, 2, 5} = ..... ({5} or {1, 2} or $\varnothing$ or {1, 2, 5})

E) The number of subsets for the set {5} is ..... (0 or 1 or 2 or 3)

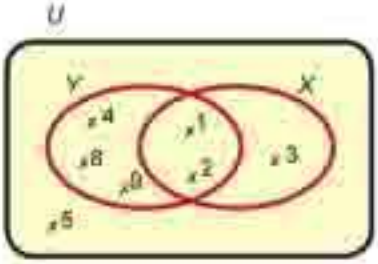
**4** If **U** = {1, 2, 3, 4, 5, 6 }, X = {2, 3, 5} and Y = { 3, 4, 5}. Represent the sets by Venn diagram, then write each of the following by the listing method

X $\cup$ Y, X $\cap$ Y, X - Y and X'

**5** Describe the colored section in each of the following shapes:



**6** Look at the opposite Venn diagram and find the following sets using the listing method.



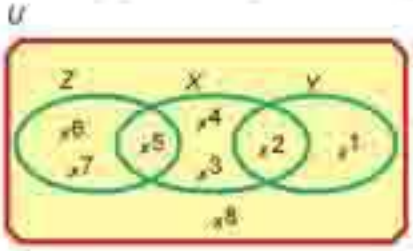

(A) $X \cup Y$ (B) $X \cap Y$

(C) $X - Y$ (D) $Y'$

(E) $(X \cup Y)'$

**7** Write down all the subsets for the set X = {a, b, c}

**8** Look at the opposite Venn diagrams, then find the following sets using the listing method:




(A) $X \cap Z$ (B) $X - Y$

(C) $Y - Z$ (D) $X \cup Z$

(E) $Z - X$ (F) $X$

**9** If X = { 3, 4, 5}, Y = { 2, 3, 4}

place the suitable symbol ∈ or ∉ or ⊂ or ⊄ in the blanks.

(A) 2 ..... X (B) {3, 5 } ..... $X \cap Y$

(C) {3, 2} ..... $X \cup Y$ (D) 5 ..... $X - Y$

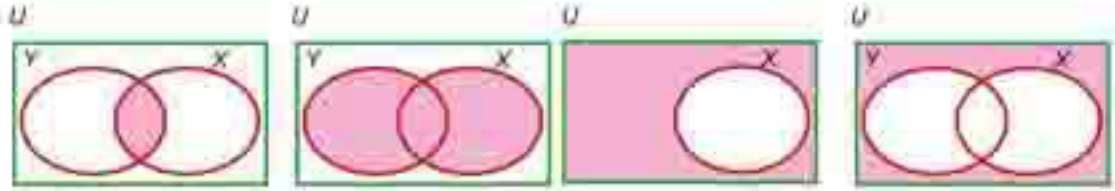
(E) ∅ ..... Y (F) {2, 3, 4} ..... X

**10** Find the value of x to make each of the following sentences true.

(A) $3 \in \{5, 7, x + 1\}$ (B) $X \in \{2, 5\} \cap \{3, 5\}$

(C) $\{2, X\} \cap \{3, 7\} = \{3\}$

**11** Write down what each colored section represents in the following Venn diagrams.




**12** Find all the subsets for the set X = {a, b, c, d} where each subset has 2 elements. Find the number of those sets.

# Activity

**1** **Use the map of ARE, with the help of your teacher of geography then write down the following sets:**

X the set of Egyptian coastal governorates

Y the set of the governorates in upper Egypt

Z the set of the governorates in lower Egypt (Delta)

Find: $X \cap Y$ , $Y \cup Z$ and $X - Y$

Is the set of the capitals of the world's countries a finite set? Explain why.

**2** **Form a team work with your classmates, then find:**

X The set of the students in your class who are older than 10 years.

Y The set of the students in your class who are younger than 10 years.

Does $X \cup Y$ represent the set of the students in your class?

Test

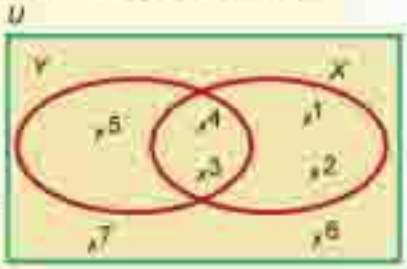
# Unit Test

**1** **Place the suitable symbol ∈ or ∉ or ⊂ or ⊄ in the blanks to make each of the following sentences true:**

(A) {52} ..... {2 , 5}.
(B) {3} ..... {1, 3}.
(C) 5 ..... the set of the digits in the number 2513.
(D) 4 ..... {44}.

**2** **Look at the opposite Venn diagram, then find each of the following:**

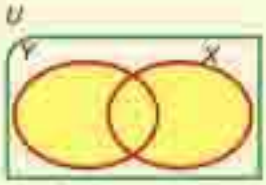
(A) X ∩ Y
(B) X ∪ Y
(C) X - Y
(D) Y' - X
(E) Y'
(F) (X ∪ Y)'

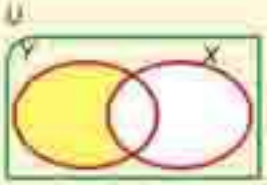


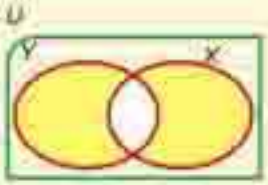

**3** **Choose the correct answer from the parentheses in each of the following sentences:**

(A) If { 2, 3, 4} = { 3, 4, x} then x = ..... (2 or 3 or 4 or 5)
(B) ∅ ..... {0} ..... (= or ⊂ or ⊄ or ∈)
(C) If X ⊂ Y then X ∩ Y = ..... (X or Y or ∅ or U)
(D) X - X = ..... (0 or {0} or ∅ or X)
(E) If a ∈ X then a ..... X' ..... (⊄ or ∉ or ∈ or ⊂)

**4** Write down what the colored section in each of the following Venn diagram represents:




**5** **IF U = { 1, 2,3, 4, 5, 6, 7 }, X = { 1, 2, 3, 4} and Y = {1, 2, 5, 6}**

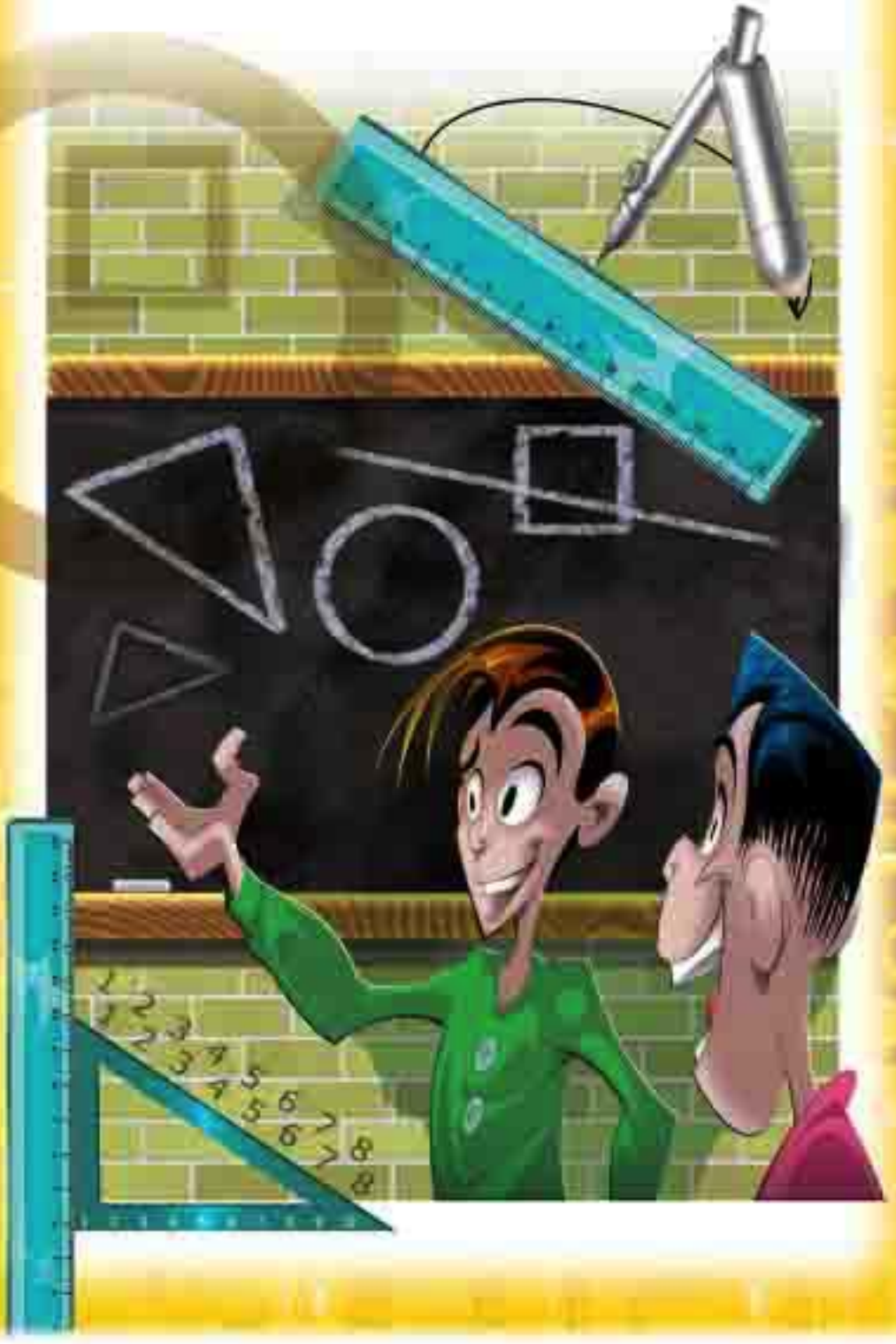
**Write down each of the following sets using the listing method:**

(A) X ∪ Y
(B) X ∩ Y
(C) X - Y
(D) X'
(E) Y'
(F) (X ∩ Y)'

# Unit 3

# Geometry

3



3-1

# The Circle

**You will learn**

- To define a circle.
- To draw a circle.

**Key Terms**

- Circle
- The center of a circle
- The radius of a circle
- The diameter of a circle
- The chord of a circle

Hossam has become a new member in the scouts team. He has fixed a stake in the ground and tied a rope to the stake. Then, he fixed another stake at the other end of the rope. He completely pulled the rope, and turned a full turn around the fixed stake to draw a curved line on the ground.

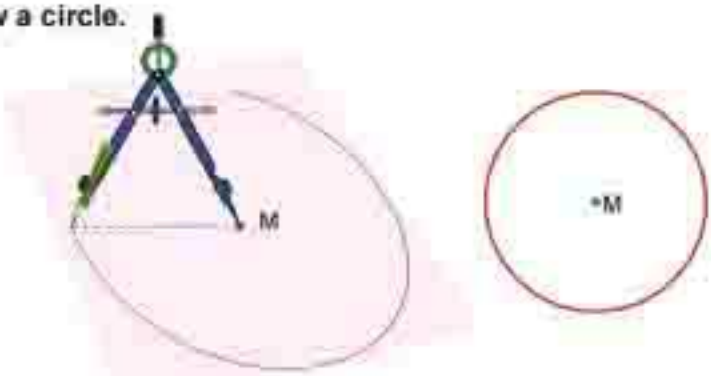
Take part with your physical education teacher at school and draw the circle on the football playground, then mark it using lime.

**This closed curve is called a "circle".**

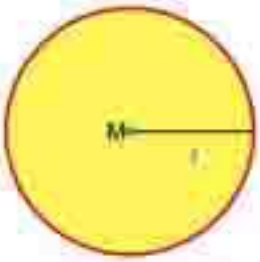
**The point in which the stake is fixed is called the center of the circle.**

## How to draw a circle

**Use the compasses as illustrated in the following figure to draw a circle.**



**The red curved line represents the circle M.**




**The point M is called the center of the circle. The distance between the sharp point of the compasses and the pencil which draws the circle is called:**

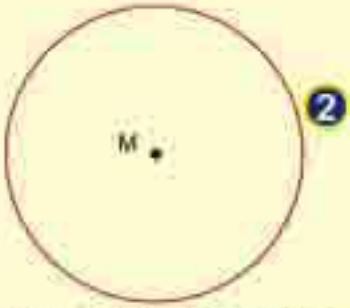
**the length of the radius and it is denoted by the symbol (r)**

**Example**

**Draw a circle of a radius 3 cm.**

**solution**

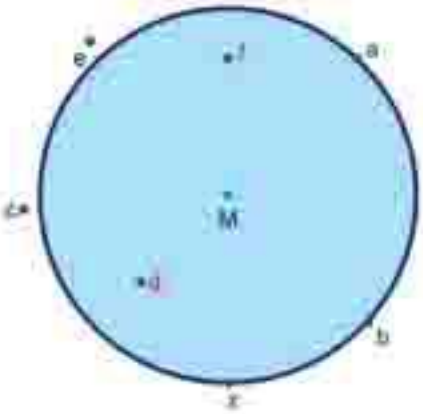
adjust the compasses to the distance of 3 cm




Draw the circle using the compasses.

**Note that**

**In the opposite figure: a circle of a radius (r)**




**First:** The points A, B, X are located on the circle

i.e. a ∈ **Circle, then MA = r**

b ∈ **Circle, then M B = r**

**Complete:** x ∈ **Circle M, then** .....

**Second:** The point **f** is located inside the circle **M**

So, **Mf** is shorter than the length of the radius.

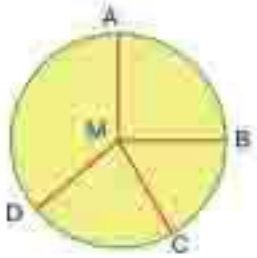
**i.e., Mf < r**

**Complete: d is located inside the circle M, then** .....

**Third:** The two points c and e are located outside the circle so, Mc > r and similiary Me > r.

## Key Terms

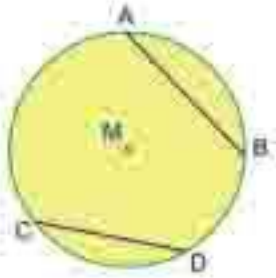
**The radius:**
**The radius of a circle is a line segment whose endpoints are the center of the circle, and any point ∈ the circle.**




**Ex.:** $\overline{MA}$ , $\overline{MB}$ , $\overline{MC}$ , $\overline{MD}$

So, MA = MB = MC = MD = r

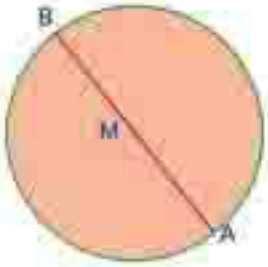
**The chord of a circle:**
**The chord of a circle is a line segment that connects between any two points on the circle.**




**Ex.: Draw** $\overline{AB}$ , $\overline{CD}$ , Draw each $\overline{AC}$ , $\overline{AD}$

**Complete** $\overline{AC}$ is called ..... , $\overline{AD}$ is called .....

**The diameter of a circle: The diameter of a circle is a chord that crosses the center of the circle.**
**diameter = 2 x Radius = 2r**
**The diameter is the longest chord in a circle.**




## Practice

**1** (A) Draw a circle of a radius 2cm where M is the center of the circle.

(B) On the same paper on which you drew the circle, label the following points A, B, C where MA = 1.5cm, MB = 3cm, MC = 2cm

(C) **Complete by choosing (on, outside, or inside) the circle to make each sentence true:**

Point A is located ..... the circle. Point B is located ..... the circle.

Point C is located ..... the circle. Point M is located ..... the circle.

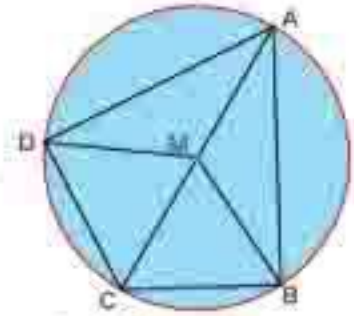
## Excercises

**1 In the opposite figure, there is a circle whose center is M. Complete:**

The radii of the circle are ..... , ..... , ..... , .....

The diameter of the circle is .....

The chords of the circle are ..... , ..... , ..... , .....

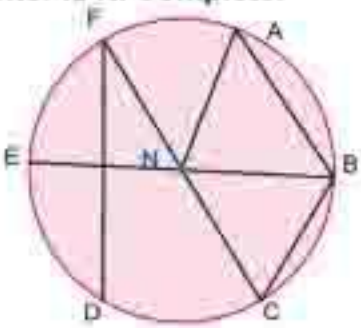



**2 In the opposite figure, there is a circle whose center is N. Complete:**

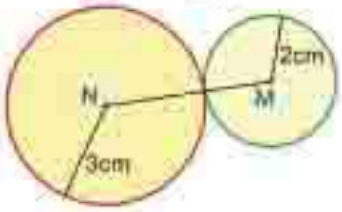
The radii of the circle are .....

The diameters of the circle are .....

The chords of the circle are .....




**3 In the opposite figure; M, N are two circles. Find the length of $\overline{MN}$**




**4** Draw a circle whose center is M and its diameter is 6cm, then draw a striaght line that passes through the point M and intersects the circle at A, B. Draw another straight line that passes through the point M and intersects the circle at C, D

**Complete:**

(A) $\overline{AB}$ is called ..... in the circle.

(B) $\overline{CD}$ is called ..... in the circle

(C) $\overline{MB}$ is called ..... in the circle

(D) Put a suitable sign ( > , < or = )

AB ..... CD, MC ..... 3cm, ..... BD ..... 6cm

# 3-2

# Drawing a triangle given the lengths of its three sides

**You have learned to draw a triangle in the following two cases:**

1. Given the lengths of two of its sides and the measure of the included angle.
2. Given the length of one of its sides and the measures of two angles.

**Now, you will learn to draw a triangle given the lengths of its three sides using a ruler and a compasses.**

**You will learn**

- To draw an equilateral triangle.
- To draw an isosceles triangle.
- To draw a scalene triangle.

**Key Terms**

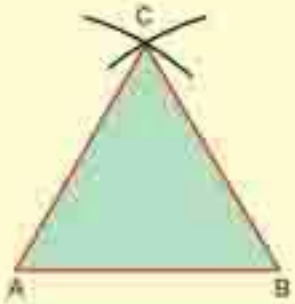
- Equilaterul triangle
- Isosceles triangle
- Scalene triangle

**Example 1**

**Draw the equilateral triangle ABC in which the length of every side is 4cm.**

**Solution:**

1. Draw the line segment $\overline{AB}$ of length 4cm.
2. Adjust the compasses to a distance equal to 4cm, then place the sharp point at A and draw an arc.
3. Using the same distance, place the compasses at B, then draw another arc that intersects the first arc at C.
4. Draw $\overline{AC}$ , $\overline{BC}$ So, you will have the equilateral triangle ABC.




**Practice** **Draw the equilateral triangle LMN whose perimeter is 9cm.**



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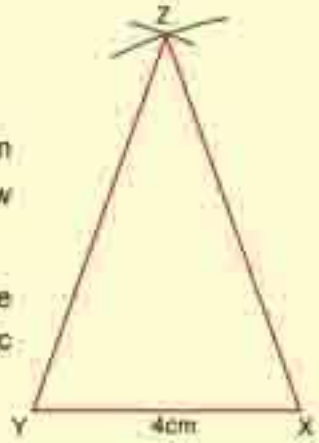
**Example 2**

**Draw the isosceles triangle XYZ in which the length of the base = 4cm, and the length of each of its two other sides = 6cm.**

**Solution:**




1. Draw the line segment $\overline{XY}$ where XY = 4cm
2. Adjust your compasses to a distance equal to 6cm and with the tip of the compasses at X and draw an arc.
3. Place the sharp point to Y. Using the same distance to draw another arc that intersects with the first arc at Z.
4. Draw each of $\overline{XY}$ , $\overline{YZ}$ , so, you will have the isosceles triangle XYZ.

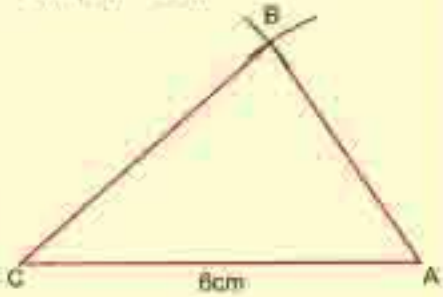
## Practice

**Draw the isosceles triangle in which BC = 5cm, AB = AC = 4cm.**

**Example 3**

**Draw the triangle ABC in which AB = 4cm, BC = 5cm, AC = 6cm**

**Solution:**




1. Draw the line segment $\overline{AC}$ with length = 6cm.
2. Adjust your compasses to a distance equal to 4cm, then place the sharp point at A and draw an arc.
3. Adjust your compasses to a distance equal to 5cm, then place the sharp point at C and draw another arc that intersects the first arc at B.
4. Draw $\overline{AB}$ , $\overline{BC}$ so, you will get the triangle ABC.

## Exercieses

1. Draw the triangle ABC in which AB = 3cm, BC = 4cm, AC = 5cm. What do you observe?

2. Draw the triangle XYZ in which XY = YZ = 7cm, XZ = 4 cm.

3. Draw the triangle LMN in which LM = 8cm, MN = 5cm NL = 6cm.

4. Draw a circle of a radius 2.5cm and draw $\overline{AB}$ as its diameter, then complete drawing the equilateral triangle ABC, then choose the correct answer:

   A. The point C is located ..... the circle (inside - outside - on)

   B. $\overline{AC}$ is ..... (a chord - a radius - something else).

5. Draw the triangle ABC in which: AB = 4cm, BC = 6cm CA = 8cm. Then draw a circle whose center is B and its radius is equal to 4cm, then complete the following:

   A. The point A is located .... the circle.

   B. The point C is located ..... the circle.

   C. The .... is called the radius of the circle.

6. Draw the equilateral triangle ABC whose side is equal to 4cm, then draw a circle whose center is A and radius is equal to 4cm, then complete the following:

   $\overline{AB}$ is called ..... in the circle.

   $\overline{AC}$ is called ..... in the circle.

   $\overline{BC}$ is called ..... in the circle.

# 3-3

## Drawing line segments from the vertices of a triangle perpendicular to its opposite sides

**Introduction**

Drawing a line segment from a point, perpendicular to a straight line.

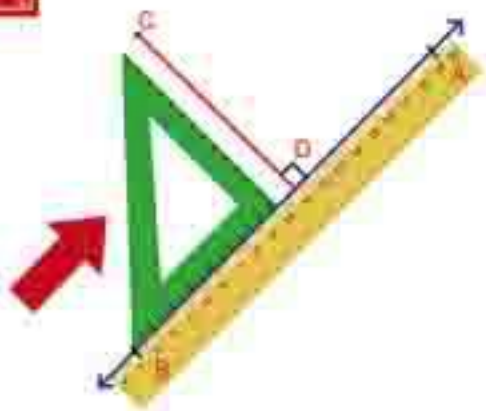
If $\overleftrightarrow{AB}$ is a straight line, $C \notin \overleftrightarrow{AB}$

**Required:** drawing a line segment from point C perpendicular to $\overleftrightarrow{AB}$

**Materials**

The ruler - the right triangle

**Method**




1. Put the ruler on $\overleftrightarrow{AB}$
2. Put one of the right angle sides of the set square on the ruler as illustrated above in the figure.
3. Move the set square in the direction of the arrow. The set square will slide on the ruler till it reaches the point C.
4. Draw $\overline{CD}$ then $\overline{CD} \perp \overleftrightarrow{AB}$

**You will learn**

- To draw a line segment from a vertex of a triangle, perpendicular to the opposite side.
- To define the altitudes of a triangle.

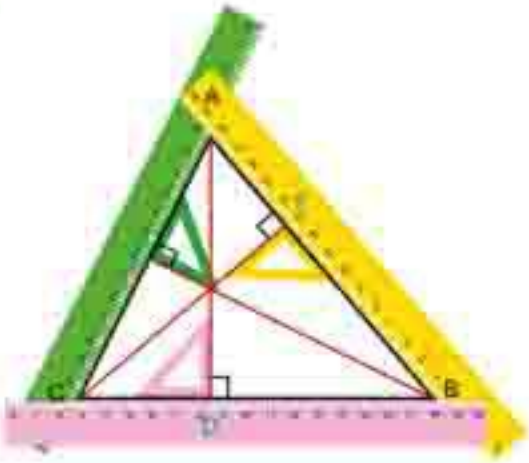
**Key Terms**

- The altitudes of a triangle

## The altitudes of a triangle

### First: The altitudes of the acute triangle:

**In the opposite figure, ABC is an acute triangle. Follow the same previous steps to draw:**




$\overline{AD} \perp \overleftrightarrow{BC}$ **and** $\overline{BE} \perp \overleftrightarrow{AC}$ ,

$\overline{CF} \perp \overleftrightarrow{AB}$ .

**Note that**

1. $\overline{AD}$ , $\overline{BE}$ , $\overline{CF}$ intersect at one point located inside the triangle ABC.
2. The line segments $\overline{AD}$ , $\overline{BE}$ , $\overline{CF}$ are called the altitudes of the triangle ABC.

## Practice

1. Draw the equilateral triangle ABC whose side is equal to 6cm. Then from its vertices, draw the segments $\overline{AD}$ , $\overline{BE}$ , $\overline{CF}$ perpendicular to the opposite sides: $\overline{BC}$ , $\overline{CA}$ , $\overline{AB}$ respectively. Then, measure the lengths of $\overline{AD}$ , $\overline{BE}$ , $\overline{CF}$ . What do you observe?

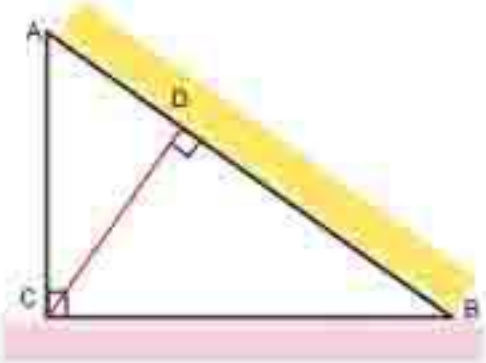
2. Draw the triangle LMN in which LM = 4cm, MN = 5cm, NL = 6cm. Then, draw a perpendicular from L to $\overline{MN}$ that intersects it at X. Also draw a perpendicular from M to $\overline{LN}$ that intersects it at Y, then measure the lengths of $\overline{LX}$ , $\overline{MY}$ .

**Second: The altitudes of the right triangle.**

**In the opposite figure, ABC is a right triangle in C.**

**Follow the same steps.**

**Draw a line segment from A perpendiculair to $\overleftrightarrow{BC}$, then the line segment will be $\overline{AC}$.**




Draw a line segment from B perpendicular to $\overleftrightarrow{AC}$, then the line segment will be $\overline{BC}$.

Draw a perpendicular line segment from C to $\overleftrightarrow{AB}$, **The perpendicular segment is** $\overline{CD}$.

**Note that**

1. $\overline{AC}$, $\overline{BC}$, $\overline{CD}$ intersect at point C (the right vertex)
2. The altitudes of the triangle are $\overline{AC}$, $\overline{BC}$, $\overline{CD}$.

## Practice

1. Draw the isosceles triangle ABC whose right angle is B and in which AB = 5cm, then draw the line segment $\overline{DB}$ from point B perpendicular to $\overline{AC}$ and find the length of that line segment.
2. Draw a circle whose center is M and radius is equal to 4cm. Draw the diameter $\overline{AB}$ and label the point C $\in$ the circle M, then draw the triangle ABC and the line segments from its vertices and perpendicular to the opposite sides of the triangle ABC, then label the point of intersection for these line segments.
3. Draw the triangle ABC in which AB = 6cm, BC = 3cm, **m**($\angle$ B) = 60°, then measure the altitudes of that triangle.

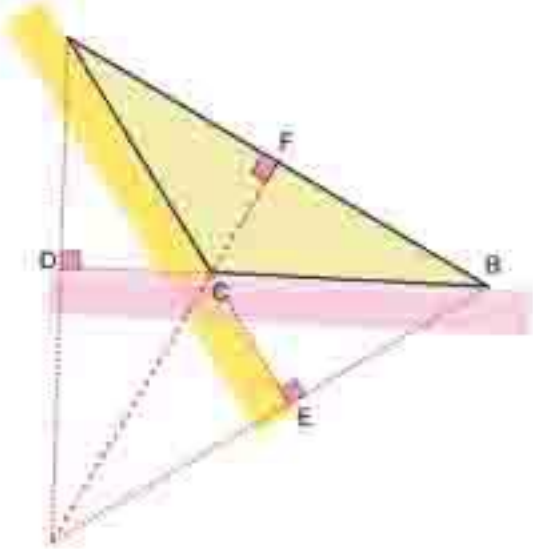
**Third: The altitudes of the obtuse triangle:**

**In the opposite figure, ABC is a triangle whose angle C is obtuse . Follow the same previous steps:**

Draw $\overline{AD} \perp \overleftrightarrow{BC}$

**and similarly** $\overline{BE} \perp \overleftrightarrow{AC}$ ,

$\overline{CF} \perp \overleftrightarrow{AB}$




**Note that**

- The altitudes of the triangle are the segments: $\overline{AD}$ , $\overline{BE}$ , $\overline{CF}$ .
- $\overleftrightarrow{AD}$ , $\overleftrightarrow{BE}$ , $\overleftrightarrow{CF}$ intersect at one point which is located outside the triangle ABC.

## Practice

1. Draw the triangle ABC in which AB = 5cm, BC = 6cm, m (∠B) = 120° . Then, draw $\overline{AD}$ perpendicular to $\overleftrightarrow{BC}$ , and measure the length of $\overline{AD}$. Draw also $\overline{BE}$ perpendicular to $\overleftrightarrow{AC}$ and measure the length of $\overline{BE}$ .

   Are $\overleftrightarrow{AD}$ and $\overleftrightarrow{BE}$ intersected at one point?

2. Draw the rectangle ABCD in which AB = 3cm, BC = 5cm, then label the point $X \in \overrightarrow{DA}$ where AX = 2cm. How many locations can be labeled for the point X on the ray $\overrightarrow{DA}$. Draw the traingle XBC then draw $\overline{XY}$ perpendicular from X to $\overleftrightarrow{BC}$.

   Can you know the length of $\overline{XY}$ without measuring it by a ruler?

## General Exercises

**1 Put (✓) for the true sentence and (✗) for the false one:**

A. The length of the diameter of a circle > the length of any chord which doesn't pass throught its center. ( )

B. The right triangle has only one altitude. ( )

C. The line segments drawn from the vertices of the acute triangle perpendicular to the opposite sides intersect at one point inside the triangle. ( )

D. Only one diameter can be drawn from any point on the circle. ( )

E. The diameter of the circle divides it into two equal halves. ( )

**2** Draw a circle whose center is N and diameter is 6cm. Then draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ in the circle. Draw $\overline{BC}$. Use the portractor to measure $\angle$ ACB then draw $\overrightarrow{CD} \perp \overline{AB}$ that intersects it at D and the circle at E, then choose the correct answer:

A. The triangle ABC is ..... (right triangle - acute traingle - obtuse traingle)

B. $\overline{CE}$ is .... in the circle (chord - diameter - radius).

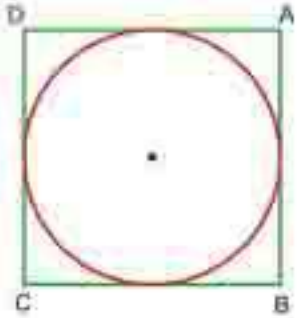
C. The intersection point of the perpendicular line segments drawn from the vertices of the triangle ABC to the opposite sides is (C - D - E)

**3** Draw a circle whose center is M and radius 4cm then draw two radii $\overline{MX}$, $\overline{MY}$ and the included angle between them measures 60° then draw $\overline{XY}$ and find the length of $\overline{XY}$.

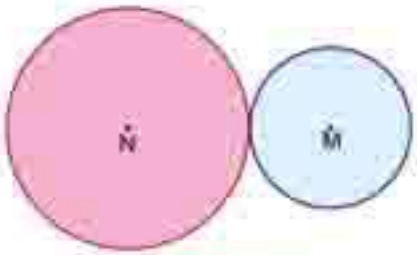
4. Draw the triangle ABC in which AB = 7cm , BC = CA = 6cm. Then, draw the line segment from point C that is perpendicular to $\overline{AB}$ and find its length.

5. Draw the triangle XYZ in which XY = 3cm, YZ = 5cm, ZX = 7cm. Determine the type of the triangle according to the measures of its angles, then draw the perpendicular segment from X to $\overline{YZ}$ and measure its length.

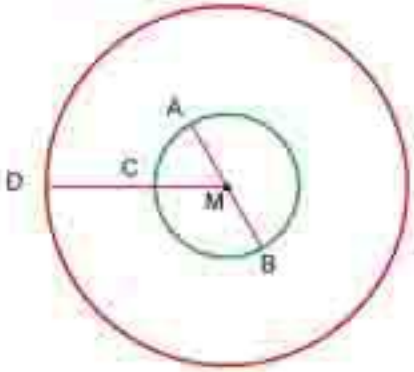
6. In the opposite figure, find the perimeter of the square ABCD given the length of the circle's radius = 3cm




7. In the opposite figure, M, N are two circles where their diameters are 4cm, 6cm. Find the length of $\overline{MN}$.




8. **In the opposite figure, there are two circles with the same center M. If their radii were 2cm, 5cm. Complete:**




(A) The length of $\overline{CD}$ = ..... cm

(B) The length of $\overline{AB}$ = ..... cm

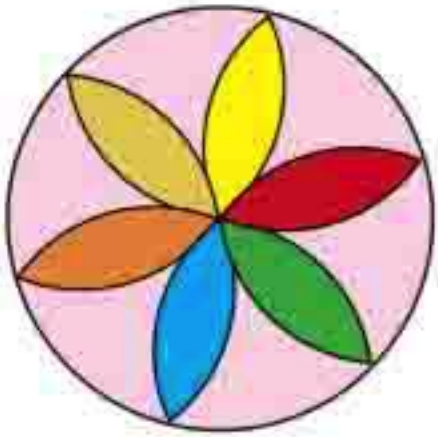
Draw the ray $\overrightarrow{DC}$ from D which intersects the small circle at E and intersects the large circle at F, then find the length of $\overline{DF}$.

9. Draw the triangle ABC in which AB = 6cm, BC = 8cm and AC = 10cm. Draw the circle M in which $\overline{AC}$ is the diameter and find the length of $\overline{MB}$.

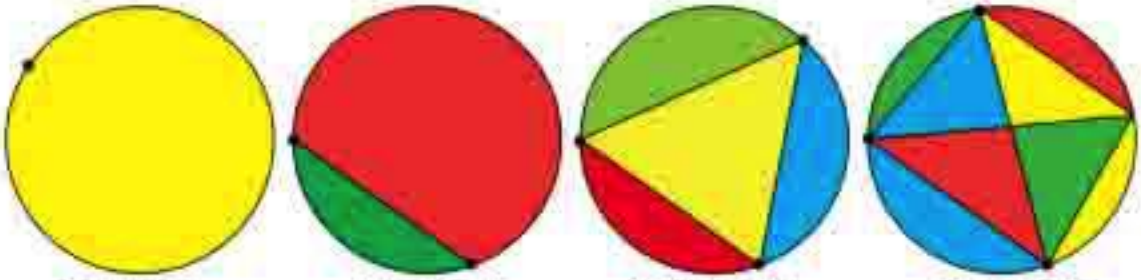
# Activity

## Play with the compasses

1. Draw the following figure, and innovate other decorative figures.



2. Notice the pattern by placing points on the circle. Draw the line segments that connect every two points, then you will be able to determine the number of zones which are included in the surface of a circle.



one point
one zone

two points
two zones

three points
four zones

four points
zones

How many zones are there on the circle in case of having five points?

# Unit Test

**1 Complete the following to have true sentences:**

A. The chord of a circle is a line segment that connects .

B. The longest chord in a circle is called .

C. The midpoint of any diameter in a circle is of the circle.

D. is used in drawing the circle.

**2 Choose the correct answer from the parentheses:**

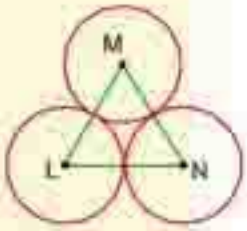
A. If M is a circle whose diameter is 8cm where MA = 7cm then the point A is located (inside - outside - on) the circle.

B. If A, B belong to the circle M where M $\in \overline{AB}$ then $\overline{AB}$ is called a (chord - diameter - radius) in the circle.

C. The number of altitudes in any triangle = (1 - 2 - 3).

D. If $\overline{AB}$ , $\overline{AC}$ are two chords in a circle, then $\overline{BC}$ is a (chord-diameter - radius) in the same circle.

E. In the opposite figure, if the length of each radius in the three circles is 3cm, then the perimeter of the triangle MLN = (6 - 9 - 18) cm




**3** A. Draw a circle whose centre is M and radius is 2.5cm. Then draw its diameter $\overline{AB}$ and draw its chord $\overline{AC}$ of length 3cm. Draw $\overline{BC}$ then find its length.

B. Draw the isosceles triangle ABC in which BC = 4cm. and AB = AC = 6cm. Then, draw perpendicular segments from their vertices to their three sides.

# Unit four

# Probability

4

Ebook for Modern printing

# 4-1

# Experimental Probability

**You will learn**

- To find the probability from an experiment or a sample.
- To predict using a given probability.

**Key Terms**

- Experimental probability
- Experiment
- Sample
- Prediction

## Let's play

When you toss one coin there are two possible ways the coin can land either head H or tail T .

The class is divided into groups. Each group tosses a coin 10 times, 20 times, 50 times and 100 times then observe the results and record them in the following table

| number of tossing a coin | number of occurrence of heads | number of occurrence of tails |
|---|---|---|
| 10 times | | |
| 20 times | | |
| 50 times | | |
| 100 times | | |

**What do you notice?**

**Notice:**

**Increasing the number of tossing a coin tells the fact that the number of occurrence of heads is nearly equal to the number of occurrence of tails.**

**For instance, tossing a coin 1000 times**

the numbers of occurrence of heads may be 506 times while the number of occurrence of tails may be 1000 – 506 = 494 times.

It is said: the probability of occurrence of heads in 1000 times = $\frac{506}{1000}$ = 0.506 while the probability of occurrence of tails in 1000 times = $\frac{494}{1000}$ = 0.494



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**Think** Is it possible to predict the number of occurrence of heads when tossing a coin 10000 times? Explain.

**Example**

The opposite table shows the result of a survey of asking 40 students about their favorite breakfast.

**What is the probability of choosing foul and tamaya?**

**What is the probability of choosing pies?**

**What is the probability of choosing cheese and dessert?**

If the number of student is 400 students. How can you predict about the number of students choosing foul and tamaya?

| Breakfast | |
|---|---|
| Foul and tamayia | 20 |
| Pie | 4 |
| Cheese and dessert | 16 |

**Solution**

**Probability of choosing foul and tamaya** $= \frac{20}{40} = \frac{1}{2}$

**Probability of choosing pie** $= \frac{4}{40} = \frac{1}{10}$

**Probability of choosing cheese and dessert** $= \frac{16}{40} = \frac{2}{5}$

Thus, the prediction about the number of students choosing foul and tamaya $= 400 \times \frac{1}{2} = 200$ students

**Think** **If the number of students in the survey applied was 800 students. How can you predict:**

(A) The number of students choosing "Pie"?

(B) The number of students choosing "Cheese and Dessert"?

## Exercises

**1** Electric lamps manufacturing company keeps track of 1000 lamps of its production to know the maximum working hours before tearing down. The following table lists these data:

| Maximum working hours | less than 150 h | 150 – 400 h | 400 – 1000 h | more than 1000 h |
|---|---|---|---|---|
| Number of lamps | 80 | 250 | 350 | 320 |

**If you bought a lamp at this company, what is the probability to tear down?**

(A) Before 150 working hours (B) After 400 working hours.

2 Rolling a number cube numbered from (1 to 6) 250 times.
How many times are predicted to get an even number?

3 **A survey was applied to ask 10 students about the foreign language they prefer to study. 5 students prefer English, 3 students prefer French and 2 students prefer German. If the total number of students in the school is 600 students.**

How many students are predicted to prefer studying German?

4 **Eman, Aml and Maha clean their school in turns. They roll a number cube with two faces numbered 1, two faces numbered 2 and two faces numbered 3.**

Eman does the cleaning if the faces numbered 1 appear.
Aml does the cleaning if the faces numbered 2 appear.
Maha does the cleaning if the faces numbered 3 appear.
How often do you predict each one does the cleaning within a 30-day month?

# 4-2

## Theoretical Probability

**Think and Discuss**

Discuss with your teacher the following experiments, their outcomes and the sample space of each:

**Experiment 1:**

Tossing a regular coin and observing the outcomes.
**Outcomes:** There are 2 possible ways the coin can land: heads (H) or tails (T).
Sample space: S = {H, T}

**Experiment 2:**

Rolling a regular number cube numbered from 1 to 6.
**Outcomes:** All possible outcomes are 1, 2, 3, 4, 5, or 6
Sample space: S = {1, 2, 3, 4, 5, 6}

**Experiment 3:**

Having a baby and determining the gender of the newborn baby.
**Outcomes:** a boy (B) or a girl (G).
**Sample Space:** S = {B, G}

**Experiment 4:**

Playing a football game and determining the result of a team. Outcomes: All possible outcomes are win, or ..... or .....
**Sample Space:** S { ....., ....., .....}

**You will learn**

- To find an event.

**Key - terms**

- Theoretical probability
- Outcomes of an experiment
- Sample space

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**Experiment 5:**

To spin a spinner divided into 6 sections

Outcomes: all possible outcomes are 1, 2, 3, 4, 5, 6.

Sample space: S {.....}

To spin an odd number is a subset of the sample space. This individual outcome is called an event and the subset = {1, 3, 5}

**An event is a subset of the sample space**

**In experiment 5:**

The probability of spinning an odd number = $\frac{\text{number of outcomes of an event}}{\text{Number of all possible outcomes}} = \frac{3}{6} = \frac{1}{2}$

**Examples**

1. A bag contains 5 white marbles, 7 black marbles and 3 red marbles. All marbles are equally likely in size. Randomly a marble is selected.

**Calculate the probability of selecting:**

(A) A black marble

(B) A yellow marble

(C) A white or red marble

| white | black | red | total |
|---|---|---|---|
| 5 | 7 | 3 | 15 |

**Solution**

(A) P (black) = $\frac{\text{Number of black marbles}}{\text{Number of all possible outcomes}} = \frac{7}{15}$

(B) P (yellow) = $\frac{0}{15}$ = 0 (impossible outcome)

(C) P (white or red) = $\frac{5}{15} + \frac{3}{15} = \frac{5+3}{15} = \frac{8}{15}$

**2** A box contains 20 cards numbered from 1 to 20. Randomly a card has been selected. Calculate the probability of selecting:

(A) A prime number

(B) A number divisible by 7

**Solution**

S = {1, 2, 3, ....., 20}  Number of elements in S = 20

(A) The event of selecting a prime number = {2, 3, 5, 7, 11, 13, 17, 19}, with number of elements = 8  P (prime number) = $\frac{8}{20} = \frac{2}{5}$

(B) The event of selecting a number divisible by 7 = {7, 14}, with number of elements = 2  P (divisible by 7) = $\frac{2}{20} = \frac{1}{10}$

## Practice

**1** In the opposite figure, the spinner is divided into 6 colored sections. What is the probability that the spinner stops at:

(A) Red.

(B) Black.

(C) Green.

**2** Circle the true answer:

(A) Tossing a regular coin, the probability of landing head = ....

($\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1)

(B) Rolling a regular number cube, The probability of getting a number divisible by 3 is .....

($\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1)

(C) A classroom holds 40 students, 25 are boys and the rest are girls. A student has been randomly selected, the probability of getting a girl is

($\frac{3}{8}$ , $\frac{5}{8}$ , $\frac{3}{5}$ , 1)

## General Exercises

**1** **Complete:**

(A) A box contains 24 lamps, 3 lamps are defective. A lamp has been randomly selected, the probability of getting a functional lamp = .....

(B) The probability of failing a student is $\frac{2}{15}$. The probability of success = .....

(C) A card has been drawn out of 5 cards containing the numbers:

32 25 14 63 27

The probability of selecting a number that the sum of its two digits is 9 = .....

(D) Rolling a regular number cube. The probability of getting an even number = ...

The probability of getting an odd number = ....

The probability of getting a prime number = .....

The probability of getting a number greater than 6 = .....

**2** The following table lists the results of a survey applied on 100 spectators of T.V.

| Program | arabic films | foreign films | series | news | football matches |
|---|---|---|---|---|---|
| Number of spectators | 19 | 20 | 15 | 10 | 36 |

A spectator has been randomly selected. Find the probability of selecting a spectator prefers

(A) football matches. (B) foreign films (C) series (D) news

**3** A card has been randomly drawn out of 10 cards numbered from 1 to 10. Find the probability of getting:

(A) An odd number (B) A prime number.

(C) An even number greater than 6

**4** A spinner is divided into 6 equal sections.

(A) What is the probability of spinning on any section?

(B) Spinning the spinner 60 times. How many times are predicted to get the letter (A) as an outcome?

# Activity

**A survey has been applied to ask 50 students about their favorite games:**

(A) What is the probability that football is the favorite game?

(B) If the number of your school students is 500 students, then predict the number of students preferring football games.

(C) What is the probability that basketball is the favorite game?

(D) In your opinion, how many students out of 500 students would prefer a basketball game?

| Students favorite Games | |
|---|---|
| **Game** | **Number of students** |
| **Football** | **25** |
| **Basketball** | **7** |
| **Table tennis** | **8** |
| **Swimming** | **10** |

Test

# Unit Test

1. The following table lists the number of 120 volunteers in 3 groups to make uniforms for the cleaners.

| Group | Design | Printing | Distribution |
|---|---|---|---|
| Number of volunteers | 30 | 30 | 60 |

A volunteer has been randomly selected. What is the probability to be one of the printing group?

2. (A) Rolling a regular number cube. What is the probability of getting an even number and not divisible by 3?

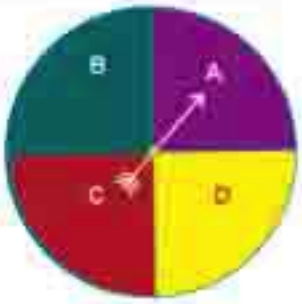
   (B) A card has been randomly selected out of cards numbered from 1 to 25. What is the probability of getting a prime number?

3. Tourists successively visit Egypt. A tourist company has organized a trip for 100 tourists to visit Egypt, 40 from Arab countries, 30 from Europe, 10 from America and 20 from Asia. The number of tourists who visited Egypt in this month was 15000 tourists. What is the predicted number of tourists from Europe who visited Egypt in this month?

4. A spinner is divided into 4 equal sections.

   (A) What is the probability of spinning the letter B?

   (B) Spin the spinner 400 times. what is the predicted number of getting letter A?





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# Exam (1)

**1** **Choose the correct answer from the parentheses:**

A. $\{3\}$ ..... $\{1, 3, 5\}$ ($\in$ , $\notin$ , $\subset$ or $\not\subset$)

B. $135.42 \div 100 =$ ..... (13542 ; 13.542 ; 1.3542 ; 1354.2)

C. $\{1, 2\} \cup \{2, 3\} =$ ..... ($\{2\}$ , $\{1, 3\}$ , $\{1, 2, 3\}$ or $\varnothing$)

D. $1\frac{1}{2} \div \frac{1}{4} =$ ..... (2 , 6 , $\frac{3}{8}$ or 12)

E. The probability of the pupil's success in an exam is $\frac{8}{10}$, therefore the probability of failing is ..... ($\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{4}$ or $\frac{2}{9}$)

**2** **Complete the following to have a true sentence:**

A. If $6 \in \{3, 5, 2x\}$ then $x =$ .....

B. $2.5781 \simeq$ ..... (approximate to the nearest hundredth)

C. When drawing a paper out of five identical papers numbered 1,2,3,4 and 5, therefore the probability that the drawn paper has a prime number = .....

D. X , Y are two sets where $X \subset Y$, then $X \cap Y =$ .....

E. The longest chord in a circle is called .....

**3** A. If the universal set $U = \{x : x$ is an odd number less than 15$\}$, $X = \{1, 3, 5\}$, $Y = \{1, 5, 9, 13\}$ Draw Venn diagram which represents the sets U , X , Y, then find: $X \cap Y$ , $X - Y$ , $Y'$

B. Find the product of $23.49 \times 4.2$ and approximate it to the nearest hundredth.

**4** A barrel has 236.25 kgs of oil, If we want to pack it in bottles where every bottle holds 0.75 kgs. Find the number of bottles.

**5** Draw a circle M whose radius is equal to 3.5cm, then draw its diameter $\overline{AB}$ and label any point $C \in$ the circle. Draw the triangle A B C and draw $\overline{CD} \perp \overline{AB}$ where $D \in \overline{AB}$ , find the length of $\overline{CD}$ ?

**6** A. Find the area of the rectangle of 15.5 meters length and 7.5 meters width.

B. When rolling a regular number cube. What is the prbability of getting

A. A number more than 6?

B. A number less than or equal to 6?

What is the name of the event in each case?

C. A sample of 40 balls: 5 are red and the rest is in different colors.

What is the predicted number of red balls when the sample contains 400 balls?

# Exam (2)

**1** **First: Put (✓) for the true sentence and (✗) for the false one:**

(A) The quotient of dividing 2.55 by 1.7 = 1.5 ( )

(B) $7 \in \{17, 77\}$ ( )

(C) $35.241 \times 100 = 3524.1$ ( )

(D) The probability of a certain event = Zero ( )

**Second:** Find the the result in each of the following.

(A) $5.7258 \times 9$ (approximate to the nearest thousandth).

(B) $51.5322 \div 9$ (approximate to the nearest hundredth)

**2** **First: Fill in the following to have a true sentence:**

(A) $\{2, 3, 6, 12\} \cap$ the set of factors for 6 = .....

(B) If $\{3, 5\} = \{1 + x, 3\}$ then x = .....

(C) To draw a circle whose diameter = 7.2cm, set the compasses to a length equal to ..... cm.

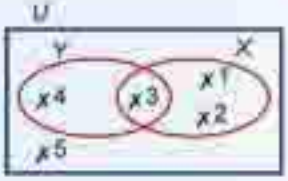
**Second: find the result in each of the following:**

(A) $4\frac{1}{2} \div 1.5$ (B) $\{2, 5, 8\} - \{3, 5, 7\}$

**Third:** What is the number which if multiplied by 0.5 the product will be 33.66.

**3** Look at the opposite Venn diagram and find:

(A) $X \cap Y$ (B) $X \cup Y$ (C) $X - Y$ (D) $Y'$




**4** Draw the triangle A B C in which A B = B C = 6cm and m(∠ B) = 120° then draw $\overline{AD} \perp \overleftrightarrow{BC}$ which intersects it at D then find the length of $\overline{AD}$

**5** A bag contains 3 white balls, 7 red balls, and 5 yellow balls. All the balls are equal in size. If a ball is randomely drawn,

**First:** What is the probability that the drawn ball is white.

**Second:** What is the probability that the drawn ball is not red.

# Exam (3)

**1** **Choose the correct answer from the parenthese:**

A $\{7, 3\}$ ..... $\{1, 3, 5, 7\}$ ($\in$ - $\notin$ - $\subset$ - $\not\subset$)

B $355 \div 18 = 3.55 \div$ ..... (1.8 , 0.18 , 18 , 1800)

C The probability of an imposible event = ..... ($\varnothing$ - 1 - 0 - 2)

D The smallest fraction from the following is ..... ($\frac{1}{3}$ - $\frac{2}{5}$ - $\frac{5}{8}$ - $\frac{2}{9}$)

E $1.25 \times 3.2$ ... $32 \times 12.5$ ..... (> - < - =)

**2** **First: Complete the following to have a true sentence:**

A $\frac{?}{80} =$ ..... approximate to the nearest hundredth.

B $\{1, 2, 3, 4\} \cap$ The set of the prime numbers = .....

C The probability that Khaled wins a game is $\frac{2}{3}$ then, the probability of losing the same game is .....

**Second: Find the following:**

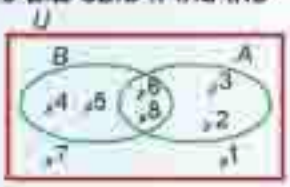
A $178.15 - 9 \times 3.2$ ..... approximate to the nearest tenth.

B $(471.72 + 8.28) \div 1.5$

**3** **First:** A man bought a TV for LE 2000 , He paid LE 440 of its cost and paid the remainder on monthly installments, each of them is equal to L.E 32.5 .Find the number of installments.

**Second:** Look at the opposite Venn diagram and find:

A $A \cup B$ B $A - B$ C $(A \cup B)'$




**4** Draw a circle whose center is M and radius = 3cm. Draw diameter $\overline{AB}$ Label the points C, D, E where MC = 2cm , MD = 5cm , ME = 3cm **then complete the following:**

A $\overline{ME}$ is called ..... B $\overline{AE}$ is called ..... C D is located ..... the circle.

**5** A family consumes 6.5 kgs of meat monthly where the cost of 1kg of meat is LE 38.5. Find what the family pays. Approximate to the nearest pound.

**6** A Draw the triangle ABC in which AB = 3cm, BC = 4cm, CA = 5cm then draw perpendiculars from its vertices to the opposite sides and label the point of their intersection.

B A survey has been applied on 50 students spending their summer time, the result was as follows. 12 students prefer summer beaches, 14 students prefer going to clubs, and the rest of students prefer going to the countryside. What is the probability that one of them spends his summer in the countryside? What is your prediction about the number of students preferring to spend their summer time in the countryside out of 500 students?

Solution of the question in thick lines on page (8):
30+70 = 40+100+170+30 = LE 450

Exercises page (8), (9):
(1) (a) 8.74
(b) 6.790
(2) (a) Hundred
(b) Hundred
(c) 3.13
(d) 29.43
(e) 33.340
(f) 866
(3) 0.2378
= 0.26 (To the nearest hundredth)
= 0.208 (To the nearest thousandth)
(4) (a) 66
(b) 0.4
(c) 2.74
(d) 4.36
(5) 34.29 kgs

Exercises page (11):
(1) The order is: $\frac{1}{6} < \frac{1}{5} < \frac{1}{4} < \frac{1}{3} < \frac{1}{2}$
(2) (a) $x = 5$ or 6 or 7 (b) $x = 7$ or 6
(3) The ascending order is: $\frac{1}{6} < \frac{1}{5} < \frac{1}{4} < \frac{1}{3} < \frac{1}{2}$
The descending order is: $\frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{5} > \frac{1}{6}$

Exercises page (13), (14):
(1) (a) ✗ (b) ✓
(c) ✓ (d) ✓
(e) ✗ (f) ✓
(2) (a) $x = 6$
(b) $b = 3$
(c) $x = \frac{3}{4}$
(3) (a) The ascending order is: $\frac{1}{6} < \frac{1}{5} < \frac{1}{4} < \frac{1}{3} < \frac{1}{2}$
(b) The descending order is:
$\frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{5} > \frac{1}{6}$

Exercises page (16):
(1) (a) 33.8 (b) 32
(c) 374.8 (d) 7214
(e) 970 (f) 3317.2
(g) 63819 (h) 341
(i) 7320 (j) 748.2
(k) 63.4 (m) 15.4
(2) (a) 9870 (b) 67 (c) 213
(3) (a) = (b) < (c) >
(4) (a) 5002 grams (b) 72809 meters
(c) 173 cm (d) 3600 meters

Exercises page (18):
(1) (a) 22.82
(b) 0.2282
(c) 228.2
(d) 193.6
(e) 19.24
(f) 2.280
(g) 0.1924
(h) 196.4
(i) 3.26 × 17 = LE 30 × (7 + 10)
= 3.26 × 7 + 3.26 × 10
= 22.82 + 32.60
= 55.42
(2) (a) 11.65
(b) 2.259
(c) 6.552
(d) 239.4
(e) 14.872
(f) 3.71
(3) LE 61.75
(4) What Ahmed pays = 5.75 × 12 = LE 21.
= 30 − 21 = LE 9

Exercises pages (21), (22):
(1) (a) = (b) < (c) >
(2) (a) 1.876 (b) 0.1471 (c) 6.4712
(3) (a) > (b) = (c) < (d) >

Practice page (23):
(1) (a) 0.52 (b) 0.39
(c) 3.5 (d) 402
(e) 310 (f) 2.43
(2) (a) 71
(b) 98.33
(3) 118
(4) 300 papers

Unit test page (60):
(1) (A) 128.81
(B) 606.96
(C) 7332.49
(D) 2.64

Central exercises page (67), (68):
(1) (A) x (B) c
(C) a (D) y
(E) y (F) x
(2) (A) (3) (B) x = 2, y = 1
(C) y, x (D) (1)
(E) x = 4
(3) (A) C (B) a
(C) 7 (D) a
(E) 1
(4) x / y x = y, y > x, x

Exercises page (72):
(1) Radii are $\overline{AN}$, $\overline{BN}$, $\overline{CN}$, $\overline{DN}$
The diameter of the circle is: $\overline{AT}$
Chords of the circle are: $\overline{AB}$, $\overline{CD}$, $\overline{BT}$, $\overline{CT}$
(2) Radii are $\overline{AN}$, $\overline{NF}$, $\overline{NC}$, $\overline{ND}$, $\overline{NE}$
The diameters of the circle are: $\overline{BE}$, $\overline{CF}$
Chords of the circle are: $\overline{CD}$, $\overline{BC}$, $\overline{AB}$, $\overline{FD}$

Exercises page (78):
(1) (A) The point C is located outside the circle

Exercises page (82):
(1) Yes

Central exercise page (83):
(1) (a) ✓
(b) ✗
(c) ✓
(d) ✓
(e) ✓

Unit test page (86):
(1) (A) Any two points on the circle
(B) The diameter of the circle
(C) The center
(D) A compasses
(2) (a) Chords
(B) A diameter
(C) 3
(D) A chord
(E) 18

Exercises pages (89), (90):
(1) Daily P is every 150 hours = $\frac{20}{150}$ = 0.08
Second P After 600 hours = $\frac{20}{600}$ = 0.03
(2) 125 times

General exercises page (98)

(1) (A) P (valid lamps) = $\frac{11}{12} = \frac{5}{6}$
(B) P (Success) = $\frac{11}{12}$
(C) P (sum of the two digit is 9) = $\frac{1}{6}$
(D) P (even number) = $\frac{1}{2} = \frac{1}{2}$
P (odd number) = $\frac{1}{2} = \frac{1}{2}$
P (prime number) = $\frac{1}{2} = \frac{1}{2}$
P (number greater than 6) = $\frac{0}{2} = 0$

(2) (A) P (watching football matches)
$= \frac{18}{50} = 0.36$
(B) P (watching foreign films) = $\frac{20}{50} = 0.4$
(C) P (watching series) = $\frac{7}{50} = 0.14$
(D) P (watching news) = $\frac{5}{50} = 0.1$

(3) (A) P (odd numbers) = $\frac{3}{6} = 0.5$
(B) P (prime number) = $\frac{2}{5} = 0.4$
(C) P (even number greater than 6)
$= \frac{1}{5} = 0.2$

(4) (A) P (the indicate stops on any section)
$= \frac{1}{4}$
(B) 16 times

Unit test page (99)

(1) P (getting red) = $\frac{3}{10} = \frac{1}{5}$

(2) (A) P (odd number is divisible by 3)
$= \frac{2}{3} = \frac{1}{3}$
(B) P (prime number) = $\frac{2}{3}$

(3) the probability that the tourist is from Europe = $\frac{20}{100} = \frac{1}{5}$
(Number of European tourists = 10000
$\times \frac{1}{5} = 4000$ tourists)

(4) (A) $\frac{1}{5}$
(B) 100

Lesson 1

- ▪ c
  ▪ 0.3542
  ▪ {1, 2, 3}
  ▪ 6
  ▪ {
- ▪ x = 3
  ▪ 2.58
  ▪ {
  ▪ {,
  ▪ diameter
- ▪ X ∩ Y = {1, 5}
  X − Y = {3}
  Y′ = {3, 7, 11}
  ▪ 98.658 = 98.66
- 315 bottles
- First: 116.25 squared meter
  Second: ▪ Zero (impossible event)
  ▪ 1 a certain event.
  Third: 50 balls

Lesson 2

- first: ▪ ✓
  ▪ ✗
  ▪ ✓
  ▪ ✗
  second ▪ 57.532
  ▪ 5.73
- first: ▪ {2, 3, 6}
  ▪ 4
  ▪ 3.6 cm
  second: ▪ 3
  ▪ {3, 8}
  Third: 67.72
- ▪ {3}
  ▪ {1, 2, 3, 4}
  ▪ {1, 2}
  ▪ {1, 2, 5}
- first: The probability that the ball is white = 1
  second: The probability that the ball is not red = $\frac{1}{6}$

Lesson 3

- ▪ c
  ▪ 0.18
  ▪ Zero
  ▪ $\frac{3}{8}$
  ▪ <
- first: ▪ 0.09
  ▪ {2, 3}
  ▪ {
  second: ▪ 149.4
  ▪ 320
- first: 48 installments
  second: ▪ {2, 3, 4, 5, 6, 8}
  ▪ {4, 2}
  ▪ {1, 7}
- ▪ radius
  ▪ chord
  ▪ outside
- second: LE 350.25
- ▪ Probability = $\frac{1}{2}$
  number = 240

# General exercises 5th Prim.

## Unit one: the fractions

**1** ***Complete:***

**(1)** 3.26 m = ..... km.

**(2)** 657 kilometers = ..... metres

**(3)** $9\frac{3}{25}$ = ..... (to the nearest tenth)

**(4)** $\frac{125}{500}$ = ..... (to the nearest unit)

**(5)** 99.995 = ..... = ..... (to the nearest hundredth.)

**(6)** $3\frac{18}{500}$ = ..... = ..... (to the nearest $\frac{1}{100}$)

**(7)** 45.27 + 28.3 = ..... = ..... (to the nearest $\frac{1}{10}$)

**(8)** 8.43 × 0.9 = ..... = ..... ( to the nearest $\frac{1}{100}$)

**(9)** the number 5.994 = 5.99 (to the nearest .....)

**(10)** 1.761 + ..... = 9.425

**(11)** $39\frac{2}{5} - 7.25$ = ..... = ..... (to the nearest unit)

**(12)** (7.2 × 5.2) + 17.4 = .....

**(13)** 46.6 dm = ..... cm

**(14)** $4\frac{1}{8} \times 2\frac{2}{3}$ = .....

**(15)** 3.75 × 1000 = .....

**(16)** 426.305 ÷ 67.19 = ..... ≈ ..... (to the nearest hundredth)

**(17)** $\frac{55}{1000}$ = _____ = _____ (to the nearest tenth)

**(18)** 73.475 ÷ 100 = _____

**(19)** 39 days = _____ weeks (to the nearest week)

**(20)** $4\frac{3}{5}$ = _____ (to the nearest whole number)

**(21)** $2\frac{1}{3} \div \frac{5}{6}$ = _____

**(22)** $\frac{2}{5} = \frac{a}{15}$ then a = _____

**(23)** $\frac{1}{2}$ km = _____ m = _____ cm

**(24)** (5.2 × 11.2) ÷ 2.5 = _____

**(25)** 69.25 × 10 = _____ = _____ (to the nearest whole number)

**(26)** _____ × 100 = 42.5

**(27)** _____ ÷ 10 = 324

**(28)** $4\frac{3}{4} - 2\frac{3}{20}$ = _____ = _____ (to the nearest $\frac{1}{100}$)

**(29)** 5.4 ton = _____ kg

**(30)**

| hour | minute | second | |
|---|---|---|---|
| 7 | 44 | 60 | = _____ hour |

## 2 *Choose the correct answer from those given :*

**(1)** The quotient of dividing 5.45 ÷ 0.5 = _____

(A) 1.9 (B) 1.09 (C) 10.9 (D) 109

**(2)** 43 days (to the nearest week) = _____

(A) 4 (B) 6 (C) 5 (D) 7

**(3)** The number 276.532 to the nearest hundredth = .....

Ⓐ 277 Ⓑ 276.53 Ⓒ 276.54 Ⓓ 276.5

**(4)** $22.22 \div 2 =$ .....

Ⓐ 11.11 Ⓑ 10.01 Ⓒ 22.22 Ⓓ 1.111

**(5)** $8.25 \div 8\frac{1}{4} =$ .....

Ⓐ 101 Ⓑ 1 Ⓒ 1.01 Ⓓ 10.1

**(6)** $327 \div 24 = 3.27 \div$ .....

Ⓐ 2.4 Ⓑ 0.24 Ⓒ 24 Ⓓ 2004

**(7)** Estimate the result $4.384 + 2.32 =$ .....

Ⓐ 6 Ⓑ 7 Ⓒ 6.6 Ⓓ 7.2

**(8)** The number of days in 254 hours equals approximately .....

Ⓐ 11 Ⓑ 10 Ⓒ 12 Ⓓ 9

**(9)** The number of months in half a year = .....

Ⓐ 6 Ⓑ 3 Ⓒ 5 Ⓓ 9

**(10)** The number of years in 69 months = .....

Ⓐ 5 Ⓑ 6 Ⓒ 7 Ⓓ 4

**(11)** $\frac{1}{25} \times 50 \times 0.25 =$ .....

Ⓐ 4 Ⓑ $\frac{1}{4}$ Ⓒ $\frac{1}{2}$ Ⓓ 2

**(12)** $\frac{1}{4} \times 4 =$ .....

Ⓐ 2 Ⓑ $\frac{1}{4}$ Ⓒ $\frac{1}{2}$ Ⓓ 1

**(13)** $5\frac{1}{8} \times =$ ..... (to the nearest hundredth)

Ⓐ 5.125 Ⓑ 5.14 Ⓒ 5.13 Ⓓ 5.1

**(14)** $2\frac{1}{4} \times 2\frac{2}{3} =$ .....

Ⓐ 6 Ⓑ 3 Ⓒ $\frac{2}{3}$ Ⓓ $2\frac{1}{4}$

**(15)** $\frac{1}{2}$ ..... $\frac{1}{3}$

Ⓐ > Ⓑ = Ⓒ < Ⓓ ≥

**(16)** The smallest fraction in the following is .....

Ⓐ $\frac{1}{3}$ Ⓑ $\frac{5}{8}$ Ⓒ $\frac{2}{9}$ Ⓓ $\frac{2}{5}$

**(17)** The greatest number in the following is .....

Ⓐ 0.111 Ⓑ 0.12 Ⓒ 0.123 Ⓓ 1.023

## 3 *Answer the following questions:*

**(1)** Arrange the following numbers ascendingly $\frac{1}{4}$ , 0.8 , 0.4 , $\frac{1}{2}$ , $\frac{3}{4}$

**(2)** Arrange the following numbers descendingly 3.4 , 0.0333 , 0.3033 , 3.333 , 0.3303

**(3)** Arrange the following numbers descendingly $5\frac{1}{2}$ , $6\frac{1}{4}$ , $5\frac{3}{4}$ , $5\frac{1}{8}$ , $5\frac{2}{5}$

**(4)** The length of a piece of cloth is 9.25 m,12 towels are made of it, the length of each towel is 0.75 m. How many metres are remainder?

**(5)** Find the result of the following :

Ⓐ $278.12 - 8 \times 2.4 =$ ..... ( to the nearest $\frac{1}{10}$)

Ⓑ $37.38 \div 100 =$ .....

Ⓒ $12\frac{1}{2} \div 6\frac{1}{4} =$ .....

Ⓓ $\frac{3}{8} \times \frac{2}{9} =$ .....

Ⓔ $12\frac{1}{2} \times \frac{4}{5} =$ .....

Ⓕ $(10.555 - 8.245) \div 2.8 =$ .....

G) $45.334 \times 100 =$ .....

H) $\frac{17}{40} \div 0.85 =$ .....

I) $9375 \div 15 =$ .....

J) $25.25 \div 0.25 =$ .....

**(6)** Put the suitable symbol (> , = , <):

A) $4.79 \times 1000$ ☐ $47.9 \times 100$

B) $3.2 \times 10$ ☐ $0.32 \times 1000$

C) $\frac{2}{5}$ m ☐ $\frac{5}{2}$ m

D) 2 dm ☐ 200 cm

E) 140.44 ☐ 34.044

**(7)** If the price of one metre of cloth is 7.35 pounds , what is the price of 3.5 metres ?

**(8)** A car consumes one litre of Benzine to cover a distance 10 km. How many litres are needed so that the car covers a distance of 642.9 km.

**(9)** Find the area of the rectangle if its dimensions are 2.4 and 4.5 cm. then approximate the result to the nearest tenth.

**(10)** If a = 18.24 , b = 8.354 Find the result of a + b to the nearest hundreadth.

Estimate the result of a + b. Is your estimate accurate or not?

**(11)** Mahmoud bought a computer for 2000 pounds. He paid 250 pounds cash money and divided the remainder into 50 equall monthly instalments. Calculate the value of each instalment.

**(12)** The product of two numbers is 625. If one of them is 25 then what is the other number ?

**(13)** Find the result of each of

**First** : $2.4 \times 4.7$ **Second:** $3.4 \times 0.29$

then from the previous operations find the value of

A) $(2.4 \times 4.7) \times 0.29$

B) $2.4 \times (3.4 \times 0.29)$

**(14)** A medical firm packed 6.25 litre of a medicine in bottles each of them is of capacity 0.025 litre. How many bottles were used ?

## Second Unit: Sets

### *First complete:*

**1** Complete by putting the suitable symbol ($\in$ , $\notin$ , $\subset$ , $\not\subset$):

A 8 ..... {7 , 5 , 8 , 88}

B {8} ..... {7 , 5 , 8 , 88}

C $\varnothing$ ..... {2 , 4}

D {8 , 4} ..... {4 , 5 , 6 , 8}

E 7 ..... {3 , 5 , 9}

F {9} ..... {99}

G {1} ..... {1 , 11 , 111}

H {1 , 2} ..... {21 , 12}

**2** Complete

A $\{3 , 4\} \cap \{2 , 4\} =$ .....

B $\{3 , 4\} \cap \{43\} =$ .....

C $\{2 , 3 , 5\} \cap \{3 , 5 , 2\} =$ .....

D $\{3 , 5\} \cup \{4 , 6\} =$ .....

E $\{2 , 4 , 7\} \cup \{1 , 4 , 7\} =$ .....

F $\{a , b , c\} \cup \{b , c , a\} =$ .....

**3** If X and Y are two non-empty sets then:

A $X \cap \varnothing =$ .....

B $X \cap X =$ .....

C If $X \subset Y$ then $X \cap Y =$ .....

D If $X \cap Y = Y$ then ..... $\subset$ .....

**4** Complete by putting the suitable symbol ($\in$ , $\notin$ , $\subset$ , $\not\subset$):

If $Y = \{2 , 4 , 6\} \cup \{1 , 2 , 3\}$ then:

A {6} ..... Y

B {1 , 2 , 3 , 4 , 6} ..... Y

C 6 ..... Y

5. If A = {5 , 6 , 7} – {2 , 4} then:

   (A) 4 ..... A (B) {5 , 6} ..... A (C) {7} ..... A

   (D) 7 ..... A (E) {2} ..... A

6. If X = {2 , 4 , 5} ∩ {5 , 3 , 7}, then 1 ..... X

7. {1 , 8} ..... {0 , 1 , 2 , 3 , 4 , 5 , ..... }

8. If X ⊂ Y then X – Y = .....

9. If X ..... Y then X ∩ Y = X

10. If X and Y ..... U then X ∪ Y = Y ∪ X

11. {5} ..... {2 , 5}

12. 3 ..... {30 , 23}

13. 12 ..... {0 , 2 , 4 , 6 , .....}

14. zero ..... { }

15. 3 ..... the set of factors of the number 18

## *Second: Choose the correct answer from those given:*

1. {34} ..... {4 , 3}

   (A) ∈ (B) ∉ (C) ⊂ (D) ⊄

2. ∅ ..... { }

   (A) ∈ (B) ∉ (C) ⊂ (D) ⊄

3. The number of subsets of the set {4 , 5} equals .....

   (A) 2 (B) 3 (C) 4 (D) 5

4. {2 , 3 , 6 , 12} ∩ the set of factors of the number 6 is .....

   (A) {2 , 3 , 6 , 12} (B) {3 , 6} (C) {4 , 6} (D) {2 , 6 , 3}

5. If X ⊂ Y then X ∩ Y = .....

   (A) X (B) Y (C) ∅ (D) U

6. If U is the set of odd numbers less than 25 then {5 , 15 , 25} ..... U

   (A) ∈ (B) ∉ (C) ⊂ (D) ⊄

7. If $\{3 , 6\} = \{1 + X , 3\}$ then $X =$ ____
   (A) 2 (B) 3 (C) 4 (D) 5
8. If $\{2 , a + 2\} \not\subset \{2 , 4 , 6 , 8\}$ then $a =$ ____
   (A) 2 (B) 4 (C) 6 (D) 8
9. 5 ____ $\{3 , 5\} \cap \{4 , 7\}$
   (A) $\in$ (B) $\notin$ (C) $\subset$ (D) $\not\subset$
10. If $X \subset Y$ then $X - Y =$ ____
    (A) X (B) Y (C) $\varnothing$ (D) U
11. If $X \cap Y = Y$ then X ____ Y
    (A) $\in$ (B) $\notin$ (C) $\subset$ (D) $\not\subset$
12. If $\{7 , 10\} \subset \{10 , x + 4\}$ then $x =$ ____
    (A) 3 (B) 4 (C) 5 (D) 6
13. If $U = \{2 , 3 , 4 , 5 , 6 , 7\}$ then
    **First:** $\varnothing$ ____ U
    (A) $\in$ (B) $\notin$ (C) $\subset$ (D) $\not\subset$
    **Second:** U ____ U
    (A) $\in$ (B) $\notin$ (C) $\subset$ (D) $\not\subset$
    **Third:** $\{6 , 7\}$ ____ U
    (A) $\in$ (B) $\notin$ (C) $\subset$ (D) $\not\subset$

## *Third: Answer the following questions:*

1. Represent the two sets A and B by Venn diagram in each of the following cases then find $A \cap B$:
   (A) $A = \{2 , 3 , 7\}$ , $B = \{1 , 4 , 8\}$ (B) $A = \{1 , 2 , 3 , 6\}$ , $B = \{2 , 3\}$
   (C) $A = \{4 , 7 , 6 , 5 , 1\}$ , $B = \{2 , 3 , 4 , 5 , 6\}$
2. Represent the two sets A and B in each of the following by Venn diagram then find $A \cup B$:
   (A) $A = \{3 , 6 , 9\}$ , $B = \{2 , 5 , 8\}$ (B) $A = \{1 , 4 , 8 , 9\}$ , $B = \{4 , 7 , 9\}$
   (C) $A = \{a , m , x\}$ , $B = \{a , f , x , m\}$

3. Using the operations of intersection and union, The difference and complement, express the shaded part in each of the follwing diagrams.

Fig. (1)

Fig. (2)

Fig. (3)

Fig. (4)

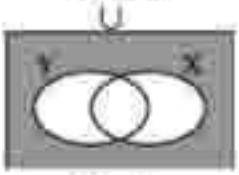


Fig. (5)

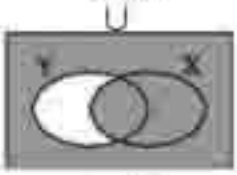
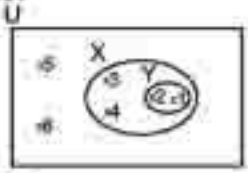


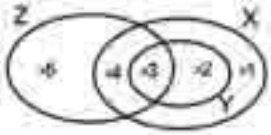
Fig. (6)

4. Use the opposite Venn diagram to write the following sets:




A. $X - Y$
B. $X \cup Y$
C. $X \cap Y$
D. $(X \cup Y)'$
E. $(X \cap Y)'$

5. Use the opposite Venn diagram to write the following sets:




A. $X, Y, Z$
B. $Y - X, Z - Y$
C. $X - (Z')'$
D. $(Y - X) \cup (Z - Y)$
E. $(X - Z) \cap (Z - Y)$

6. Use the symbols of intersection, union, difference and complement to write the shaded part in each Venn diagram of the following diagrams:

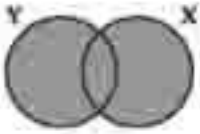


Fig. (1)

Fig. (2)

Fig. (3)

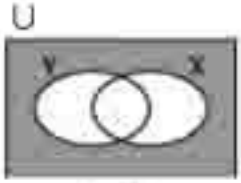
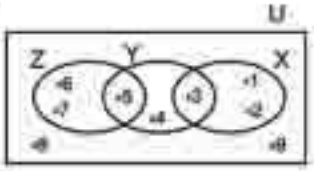


Fig. (4)

7. Using the opposite diagram write the following sets:




A. $X \cup Y$
B. $X \cap Y$
C. $X - Y$
D. $(X \cup Y)'$

## Unit Three: Geometry

### *First: Complete:*

**(1)** Any chord which passes through the centre of the circle is called ..... in it

**(2)** The triangle whose meusures of angles are 20° , 50° and 110° is called .....

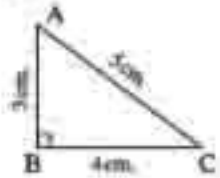
**(3)** The triangle in which there are two equal sides in length is called .....

**(4)** The triangle which the measures of its angles are 50° , 90° and 40° is called .....

**(5)** The triangle which the lengths of its sides are equal is called .....

**(6)** A circle is of diameter length 8 cm. then its radius length = ..... cm.

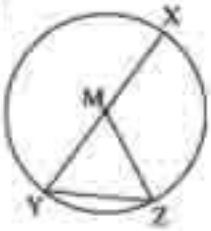
**(7)** In the opposite figure. Complete:




- (A) m ( ∠ ABC) = .....
- (B) The perimeter of Δ ABC = ..... cm.
- (C) The number of altitudes of triangle ABC = .....

**(8)** The number of altitudes of the obtuse angled triangle is .....

**(9)** In the opposite figure. Complete.




- (A) ..... is called a dimeter in the circle whose centre is M
- (B) $\overline{YZ}$ is called ..... in the circle whose centre is M
- (C) Each of $\overline{XM}$ , $\overline{YM}$ and $\overline{ZM}$ is called ..... in the circle M
- (D) Δ YMZ is called ..... triangle (due to its sides)

**(10)** The chord of the circle which passes through its centre is .....

**(11)** Any line segment which joins two points on the circle is called .....

**(12)** If the lengths of sides of Δ ABC are 6 , 6 , 6 length unit, then it is called ..... triangle and the measure of each of its angles = .....

**(13)** The diameter of the circle of radius 1 cm equals ..... cm.

**(14)** It is possible to draw a triangle if the lengths of ..... are known.

**(15)** What are the kinds (types) of the triangle due to its angles .....

**(16)** Draw the triangle ABC in which: AB = 6 cm, BC = 8 cm, AC = 10 cm, then draw the circle M whose diameter is $\overline{AC}$ , then find :

A) The perimeter of the triangle ABC

B) Use the protractor to find the measure of ∠ ABC

C) The lengths of $\overline{AM}$ , $\overline{BM}$ , $\overline{CM}$ what do you deduce ?

D) The type of Δ MBC due its angles .....

E) Mention two isosceles triangles.

**(17)** Draw the circle whose diameter length = 6 cm. Draw $\overline{BC}$ as a diameter of it, then use (B) as a centre and use the compasses with length 5 cm. to draw an arc to intersect the circle at X and Y join each of $\overline{BX}$ , $\overline{BY}$ , $\overline{CY}$ , $\overline{CX}$ , $\overline{XY}$.

If E is the point of intersection of $\overline{BC}$ and $\overline{XY}$.

**First: Complete using the protractor:**

A) m ( ∠ BXC) = .....

B) m ( ∠ BYC) = .....

C) m ( ∠ BEC) = .....

D) m ( ∠ CEY) = .....

**Second: Choose the correct answer from those given:**

A) Δ BXC is ..... triangle (acute angled , obtuse angled , right angled)

B) Δ BXY is ..... triangle (acute angled , obtuse angled , right angled)

C) Δ CXY is ..... triangle (acute angled , obtuse angled , right angled)

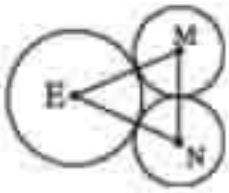
**Third: Complete:**

(A) The point of intersection of altitudes of $\Delta$ XBY is _____

(B) The altitudes of $\Delta$ XBC intersect at the point _____

**(18) In opposite figure :**

If the radius length of the circle M equals 3 cm,
and the radius lngth of the circle N = 4 cm.
and the radius length of the circle E = 5 cm.




**Complete the following:**

(A) MN = _____ cm.

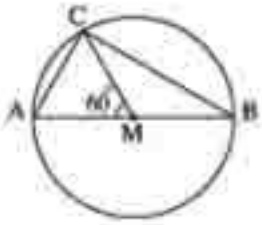
(B) ME = _____ cm.

(C) EN = _____ cm.

(D) The perimeter of $\Delta$ MEN = _____ cm.

**(19) In opposite figure :**

Put the suitable symbol (> or < or =)
to get a correct statement.




(A) A M _____ $\frac{1}{2}$ A B

(B) C B _____ A B

(C) M C _____ M B

(D) A C _____ M A

**(20)** Draw the rectangle ABCD where AB = 8 cm. BC = 6 cm. take the point $L \in \overline{AD}$, where AL = 2 cm.

Draw $\Delta$ LBC, then draw $\overline{LZ}$ perpendicular to $\overline{BC}$

Find the length of $\overline{LZ}$ (without measuring), then find the perimeter of the rectangle DLZC

**(21)** Draw the isosceles triangle ABC which is right angled at B where AB = 5 cm. from B draw the line segment which is perpendicular to $\overline{AC}$ (say $\overline{BD}$) and measure its length.

**(22)** Draw the circle M whose radius length is 3 cm. Draw $\overline{AB}$ as a diameter in it. locate the points C , D and E such that MC = 2 cm, MD = 5 cm, ME = 3 cm. then complete:

A $\overline{ME}$ is called ____ B The point D lies ____ the circle

C $\overline{AE}$ is called ____

**(23)** Draw $\Delta$ XYZ which is equilateral and its side length = 4 cm. Draw a circle of centre X and radius length 4 cm.

**Complete the following:**

A $\overline{XY}$ is called ____ in the circle X.

B $\overline{XZ}$ is called ____ in the circle X.

C $\overline{YZ}$ is called ____ in the circle X.

D The perimeter of $\Delta$ XYZ ____ cm.

**The fourth unit the probability 5th year prim**

## 1 *Choose the correct answer from those given :*

**(1)** As throwing a fair die once , then the probability of appearing the number 5 equals ____

A $\frac{1}{2}$ B $\frac{1}{6}$ C $\frac{5}{6}$ D $\frac{2}{3}$

**(2)** If a fair die is thrown once, then the probability of appearing a number greatre than 9 is ____

A 1 B zero C $\frac{1}{6}$ D $\frac{5}{6}$

**(3)** As throwing a fair die once and observing the appearing number on the upper face, then the probability of appearing an odd number is ____

A $\frac{1}{3}$ B $\frac{1}{2}$ C $\frac{5}{6}$ D $\frac{1}{6}$

**(4)** As throwing a fair die once and observing the appearing number on the upper face, then the probability of appearing a number less than 3 is ____

A $\frac{1}{3}$ B $\frac{1}{2}$ C $\frac{2}{3}$ D $\frac{1}{6}$

**(5)** As throwing a fair die once and observing the appearing number on the upper face, then the probability of appearing a number greatr than one is ____

(A) 1 (B) $\frac{1}{2}$ (C) $\frac{5}{6}$ (D) $\frac{2}{3}$

**(6)** As tossing a metalic coin once , then the probability of appearing a head is ____

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) 1 (D) $\frac{3}{4}$

**(7)** The probability that the elepahant flies = ____

(A) 1 (B) zero (C) $\varnothing$ (D) $\frac{1}{2}$

**(8)** It is ____ that the sun rises from west

(A) expected (B) possible (C) sure (D) impossible

**(9)** As throwing a fair die once and observing the appearing number on the upper face , then the probability of appearing a number divisbile by 2 is ____

(A) $\frac{1}{2}$ (B) $\frac{5}{6}$ (C) $\frac{2}{3}$ (D) $\frac{1}{3}$

**(10)** As throwing a metalic coin once, then the probability that a tail appears is ____

(A) $\frac{1}{2}$ (B) $\frac{3}{4}$ (C) 1 (D) $\frac{1}{4}$

**(11)** A class has 40 pupils. 15 of them are boys and the remainder are girls. If a pupil is chosen randomly , then the probability that the pupil is a girl is ____

(A) $\frac{1}{2}$ (B) $\frac{5}{8}$ (C) $\frac{1}{4}$ (D) 1

**(12)** As throwing a fair die once , then the probability of appearing a prime number is ____

(A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{6}$ (D) $\frac{1}{3}$

**(13)** As throwing a fair die once , then the probability of appearing a number less than or equal to 6 is ____

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) 1 (D) $\frac{3}{4}$

**(14)** The probability of the sure event is ____

(A) zero (B) 1 (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

**(15)** The probability that a bird flies = ____

(A) $\frac{1}{2}$ (B) $\frac{3}{4}$ (C) 1 (D) $\frac{1}{8}$

**2** The following table shows the result of a survey has been applied to know the views of 100 pupils about the favorite game to them:

A If one pupil is chosen at random , answer following questions:

| The game | football | handball | basketball |
|---|---|---|---|
| number of views | 50 | 40 | 10 |

**(1)** What is the probability that one of them prefers football.

**(2)** What is the probability that one of them prefers handball

**(3)** What is the probability that one of them prefers basketball.

B If there are 200 pupils , what is the expected value of the number of pupils who prefer football.

C If there are 500 pupils what is the expected value of the number of pupils who prefer basketball.

**3** A spinner is divided into 6 equal circular sectors (in area), 3 of them are red , two sectors are green, one sector is brown what is the probability that the pointer:

A Will stand on the red colour?

B Will stand on the brown colour?

C Will stand on the green colour ?

**4** A fair die is thrown once, what is the probability of each of the following events?

A appearing an odd number.

B appearing an even number.

C appearing a prime number and not even.

D appearing an odd prime number.

E appearing a number less than one.

F appearing a number more than 5.

(G) appearing a number less than 3

(H) appearing a number greater than zero and less than 7

(I) What is the name of each of the previous events ?

5. A bag contains 5 red balls , 8 black balls and 7 white balls , all of them are identical and equal in volume. A ball is drawn randomly, calculate the probability that

(A) The drawn ball is black.

(B) the drawn ball is not green.

(C) the drawn ball is red or white.

(D) the drawn ball is neither red nor white.

6. A die is thrown 200 times how many times that the appearing number is odd?

7. A box contains 30 cards numbered from 1 to 30. If a card is drawn randomly calculate the probability that the drawn card carries .....

(A) an odd number.

(B) a number divisbile by 2.

(C) An even prime number.

(D) a number divisible by 7.

(E) a number divisible by 9.

(F) a number divsible by 5 or 3.

(G) a number less than 6.

(H) a number in which the units digit is 2.

## Test One

### 1 *Complete each of the following:*

**(1)** $6\frac{1}{4} \div 12\frac{1}{2} =$ .....

**(2)** 26.274 + 23.28 = ..... ≃ ..... to the nearest $\frac{1}{100}$

**(3)** 39 days ≃ ..... weeks (to the nearest week)

**(4)** (3.7 × 0.4) ÷ 2.4 = .....

**(5)** {2 , 4 , 7} ∪ {1 , 4 , 7} = .....

### 2 *Choose the correct answer:*

**(1)** 10 halves ..... 20 fifth

(A) > (B) < (C) ≤ (D) =

**(2)** {4 , 5} ..... {2 , 3 , 7}

(A) ∈ (B) ∉ (C) ⊂ (D) ⊄

**(3)** The number of altitudes of the triangle is .....

(A) zero (B) 1 (C) 2 (D) 3

**(4)** The probability of the impossible event = .....

(A) ∅ (B) zero (C) 0.50 (D) 1

**(5)** 572.4 cm. to the nearest metre = .....

(A) 6 (B) 50 (C) 60 (D) 572

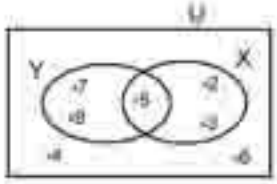
### 3

(A) In Venn diagram (in front of you).

Find by listing method:

**(1)** X ∪ Y **(2)** X ∩ Y

**(3)** X − Y **(4)** X' , Y'



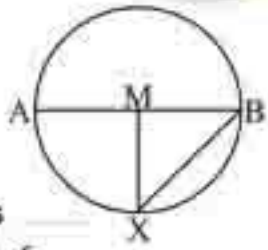

(B) Arrange the following numbers ascendingly: $14\frac{1}{4}$, 15.025, 14.375, $14\frac{1}{8}$

### 4

(A) Draw the equilateral triangle ABC whose side length = 5 cm., then draw $\overline{AD} \perp \overline{BC}$ Then find:

**(1)** The perimeter of Δ ABC **(2)** m (∠ CAD) by measuring.

B **In the opposite figure: Complete:**




**(1)** M A = ..... = .....

**(2)** The longest chord in the circle is ..... and it is called .....

**(3)** $\overline{XB}$ is called ..... in the circle whose centre is .....

**5** A As throwing a fair die once, calculate the probability of:

**First:** appearing a number greater than 6.

**Second:** an appearing even number greater than 4.

**Third:** appearing an even prime number.

B Find the perimeter of the rectangle whose length is 4.1 cm. and its width is 3.5 then Calculate its area.

## Test Two

**Answer the following questions:**

**1** ***Choose the correct answer :***

**(1)** 255 ÷ 25 = 2.55 ÷ .....

A 2.5 B 0.25 C 25 D 2500

**(2)** The longest chord in the circle is called .....

A a radius B a chord C a diameter D a tangent

**(3)** 55.241 × 100 ..... 552.41 × 10

A > B < C =

**(4)** 7 ..... {17 , 77}

A ∈ B ∉ C ⊂ D ⊄

**(5)** 254 hours ≃ .....

A 11 B 10 C 12 D 9

**2** ***Complete each of the following:***

**(1)** ABC is an equilateral triangle of side length 5 cm., then its perimeter = ..... cm.

**(2)** If X ⊂ Y then X ∩ Y = .....

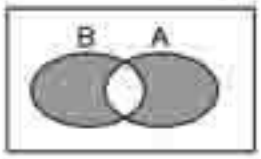
**(3)** 327 ÷ 24 = 3.27 ÷ .....

**(4)** {3, 4, 5} – {1, 2, 5} = .....

**(5)** 278.25 – 8 × 4.5 = ..... to the nearest tenth.

**3** A. A car covers equal distances in equal times. If this car covered 24.73 k in one hour, how many km are covered in $2\frac{1}{2}$ hours.

B. Write what is represented by shaded part in each diagram




**4** A. If the universal set U = the set of all factors of the number 12 and X = {1 , 3 , 2 , 6} , Y = {1 , 4 , 6 , 3},

Draw Venn diagram which represents the sets U , x , y then

**Find:** $X \cup Y$ , $X - Y$ , $Y'$ , $(X')'$

B. Write all the subsets of the set X = {a , b} what is the number of subsets?

**5** A. Draw $\Delta$ ABC where AB = 4 cm., BC = 6 cm. , CA = 8 cm., then draw a circle of centre B and its radius length = 4 cm. **From the drawing complete:**

**First:** the point A lies ..... the circle.

**Second:** the point C lies ..... the circle

**Third:** $\overline{AB}$ is called ..... in the circle

B. A metallic coin was thrown once, find the probability of appearing a head.

## Test Three

**1** ***Complete each of the following:***

A. {2 , 4 , 6} $\cap$ the set of all factors of the number 2 equals .....

B. $2\frac{3}{4} \div 1\frac{3}{8} =$ .....

C. To draw a circle of diameter length 12 cm, then the opening distance of the compasses should be ..... cm.

D. 1 – 0.999 = ..... = ..... (to the nearest $\frac{1}{10}$)

E. As throwing a metallic coin once then the sample space = ..... and the number of elements of the sample space = .....

## 2 *Choose the correct answer:*

**(1)** If {3 , 4} = {1 + y , 4}, then y = .....

Ⓐ 7 Ⓑ 4 Ⓒ 2 Ⓓ 5

**(2)** The decimal form of the common fraction $\frac{3}{20}$ is .....

Ⓐ 0.15 Ⓑ $\frac{15}{21}$ Ⓒ $\frac{1}{7}$ Ⓓ 0.3

**(3)** 2.7 × 3.5 ..... 0.27 × 35

Ⓐ > Ⓑ = Ⓒ <

**(4)** The quotient of dividing 2.25 ÷ 1.5 .....

Ⓐ 1.5 Ⓑ 15 Ⓒ 0.15 Ⓓ 500

**(5)** 12.5 + 7.632 = ..... (to the nearest $\frac{1}{100}$)

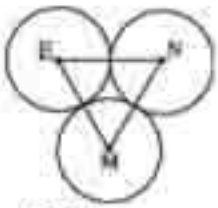
Ⓐ 20.132 Ⓑ 20.133 Ⓒ 20.13 Ⓓ 2.013

## 3

Ⓐ Find the area of the square whose side length is 5.02 m approximating the result to the nearest tenth.

Ⓑ **In the opposite figure:**

Three circles of centres M , N and E of radius length 4 cm for each, find the perimeter of MEN.




## 4

Ⓐ Draw Δ ABC where AC = 6 cm. , BC = 5 cm. , m (∠ C) = 120°

Draw $\overline{AD} \perp \overleftrightarrow{BC}$ , measure the length of $\overline{AD}$ , then draw $\overline{BX} \perp \overline{AC}$ Do $\overleftrightarrow{AD}$ and $\overleftrightarrow{BX}$ intersect at one point? measure the length of $\overline{BX}$

Ⓑ If X = 18.0735 , y = 9.453 find X + Y approximating the result to the nearest one thousandth.

## 5

Ⓐ If the price of a piece of sweet is 2.25 pounds what is the price of 25 pieces of the same kind.

Ⓑ A bag contains 5 white balls , 9 red balls and 6 black balls , all the ball are identical and equal in size. If a ball is drawn randomly. What is the probability that the drawn ball is:

**First**: white **Second:** not white **Third:** white or red.

## Test Four

### 1 Complete the following:

(1) ∅ ..... {a , b}

(2) 17.025 + 6.35 = ..... to the nearest $\frac{1}{100}$

(3) It is ..... that the sun rises from the west.

(4) As throwing a fair die once , then the probability of appearing a number less than 3 is .....

(5) The altitudes of the right angled triangle intersect at .....

### 2 Choose the correct answer :

(1) 63.598 ≈ 63.60 to the nearest part of .....

- 10
- 100
- 1000
- 000 10

(2) $3\frac{1}{2} \div \frac{7}{12} =$ .....

- 6
- $\frac{18}{3}$
- $\frac{50}{12}$
- 4

(3) 55.67 – 67.5 = .....

- 117.4
- 17.14
- 11.74
- 117.4

(4) 3 ..... {303 , 13}

- ∈
- ∉
- ⊂
- ⊄

(5) The chord which passes through the centre of the circle is called .....

- a diameter
- a radius
- a tangent
- a side

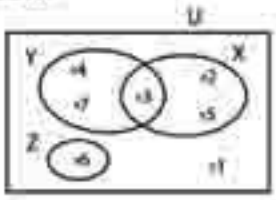
### 3

- Arrange ascendingly: 0.6 , $\frac{3}{5}$ , $\frac{3}{4}$ , 0.8
- From the opposite Venn diagram, write the following sets:

X , Y , Z

X ∪ Y ∪ Z , X ∩ Y , Y ∩ Z

X' , Y' , X – Y , Y – Z , Z – X.



**4** **A** Find the area of the rectangle whose length is 6.25 m. and its width = 2.5 m to the nearest hundredth.

**B** As throwing a fair die once , calculate the probability of appearing.

**(1)** a number greater than 3

**(2)** a number greater than or equal 3

**(3)** an odd prime number.

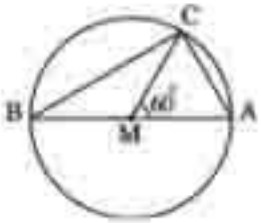
**(4)** a number divisible by 2

**5** **A** Draw $\Delta$ ABC: where AB = 6 cm. , BC = 8 cm. CA = 10 cm. Bisect $\overline{AC}$ at M then draw a circle of radius length 5 cm. and M is its centre then find.

**(1)** Two equal line segments in length in the circle M

**(2)** What is the name of $\overline{AC}$

**B** **In the opposite figure: complete:**




**(1)** m ($\angle$ AMC) = m ($\angle$ _____) = m ($\angle$ ACM)

**(2)** m ($\angle$ CMB) = _____ °

**(3)** AB > _____

## المواصفات الفنيـة:

| | |
|---|---|
| مقـاس الكتـاب: | $\frac{1}{8}$ (٥٧ × ٨٢) سم |
| طبـع المتـن: | ٤ لون |
| طبـع الغـلاف: | ٤ لون |
| ورق المتـن: | ٨٠ جم أبيض |
| ورق الغـلاف: | ٢٠٠ جم كوشيه |
| عدد الصفحات بالغلاف: | ١٣٦ صفحة |

# الأشـــراف برنتنـج هـاوس